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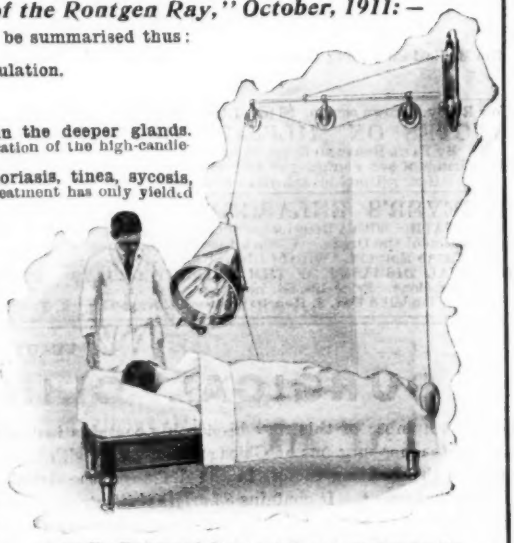

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The Lumleian Lectures
ON
MODERN ASPECTS OF HEART DISEASE.

Delivered before the Royal College of Physicians of London

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LECTURE I.

Delivered on March 13th.

MR. PRESIDENT AND GENTLEMEN,—The pleasure with which I received the great honour of an invitation to deliver these lectures was considerably diminished by the difficulty in selecting a subject. Even when a subject was selected the further problem arose as to how it was to be dealt with. In this dilemma I turned to one of my distinguished predecessors, Sir Douglas Powell, who said: "It is one of the functions of the Lumleian lecturer to review from the side of experience and clinical observation the net results of most recent researches, and to show how far they should influence us in our daily practice." This is the one and only function which I shall attempt to perform in considering some modern aspects of heart disease. Perhaps you will kindly make allowance for the difficulties which surround any attempt to do justice to such a subject at a time when other thoughts and other occupations fill our days.

RECENT ADVANCES IN CARDIOLOGY.

To many of us it has been made clear that within recent years there has been a revolution in the domain of cardiology—not a destructive revolution but a constructive one. It has really consisted in the filling-in of many gaps in our previous knowledge. Just as our predecessors were hampered by these gaps, so their completion has led to a great advance in our understanding of the subject. Exact knowledge has led to more accurate clinical diagnosis and to better therapeutic results.

Naturally there were pioneers in this work. It must be a matter of satisfaction to all in this country to recognise that British workers have been the chief pioneers. The two names that appear to me most entitled to honour are those of W. H. Gaskell and James Mackenzie. The physiological work of Gaskell gave to us much information as to the mechanism of the heart beat, the various functions of the cardiac muscular tissues, and the effects produced on them by injury or electrical stimulation. Gaskell thus fashioned the key which was to unlock the door to many cardiac problems. The key, however, lay unused until Mackenzie after strenuous work succeeded in fitting it to the lock. Probably there is no better example of the valuable assistance which experimental physiology has given to clinical medicine than the combined work of Gaskell and Mackenzie. All present workers in the field of cardiology must acknowledge their indebtedness to these two scientists, who not only laid the foundations but raised a superstructure to which comparatively little has been added.

The Functions of the Heart.

It must be admitted that the additions to our knowledge of the physiological and pathological action of the heart have greatly increased the complexity of the problems which are presented clinically. Roughly, we may say that the problems as viewed by our predecessors were concerned with the heart as a simple organ, with one function—contractility, and with two supplying nerves—the vagus as a depressor and the accelerans for stimulation. Now we have to deal with the heart as an organ of four chambers and four walls, and the action of each of the four muscular walls has to be differentiated as far as possible. This has not been finally accomplished, but by means of the polygraph and the electro-cardiograph Mackenzie and Lewis have made wonderful progress in this differentiation. The functions of the heart to be considered, in addition to contractility, are rhythmicity, excitability, conductivity, and tonicity. Formerly these were physiological terms merely, associated with experimental work, but not bearing on clinical medicine. Now these functions are investigated at the bedside and their disturbances have come to occupy a most important place in connexion with diagnosis and treatment. The vagus and accelerans nerves are not directed to the heart as a whole, but seem to exercise a controlling influence on each of the functions of the muscular tissue of the heart, so that the specialised tissues for contractility, conductivity, excitability, rhythmicity, and tonicity may be regarded as under nervous influence.

As we study the discoveries which have been made as to the extreme complexity of the cardiac mechanism we are led to ask how this machine is controlled and how far it can be influenced by human interference. The physiological working of the heart suggests that it is an automatic organism, self-starting, self-acting and effective in carrying on the circulation. Even in diseased conditions we see the power of the heart to overcome difficulties in its own way, as in the case of valvular lesions. How little influence our therapeutic measures have in the compensatory changes which the heart develops in the presence of a valvular lesion! By reason of its automatic action the cardiac machine is also protected from many of those disturbances to which other organs in the body are subject. It may be a matter of consolation to some of us when we think of the large amount of "cardiac stimulants" and "cardiac tonics" which, with misdirected energy, we have levelled at the heart, it may be a consolation to think that after all they never reached the heart and never disturbed its automatic action. This point of view, that the heart in health and disease is an automatic organ very capable of doing its own work if undisturbed, may prove of some use in regulating our therapeutic measures.

As regards the exact amount of regulation or control which is exercised over the heart by the vagus and accelerans nerves our information is still very incomplete. A useful simile is that which compares a horse and its rider with the heart and its nerve-supply. A horse can go on very well without its rider, but with a rider its actions are controlled and regulated if necessary. It has been shown that it is not the heart as a whole that is under the control of the vagus, but the individual functions of the heart. So that not only have special areas of the cardiac muscular tissue developed special functions for the harmonious movement of the heart, but these areas, or the functions of these areas, have also been placed under nervous control. One may assume that circulatory difficulties in the heart (for example, valvular) or in the circulation (for example, arterial) may be met successfully by the automatic cardiac mechanism. But disturbances also reach the heart from without and through the nervous system. For instance, in the case of excitement the heart-rate is at once increased. It may be suggested that in such cases the controlling nerves of the heart step in and regulate the functions, so that the successful carrying on of the circulation is not interfered with.

The Chambers of the Heart: Junctional Tissues.

In former times and for clinical purposes the heart was viewed as consisting of two parts, the right heart (right auricle and ventricle) and the left heart (left auricle and ventricle). In connexion with diseased conditions the terms "right-sided failure" and "left-sided failure" were in common use. Clinically it will be found that a better division of the heart would be into an auricular part (the two auricles) and a ventricular part (the two ventricles). The auricles work together, suffer together, give rise to disturbances together, and fail together. Similarly the ventricles act together. While under conditions of health the auricles act as aids to the ventricular functions, in diseased conditions they may seriously hamper those functions. There is a third portion of the heart of great clinical importance known as the junctional tissues. This is a bridge between the auricles and ventricles formed by the auriculo-ventricular node and the auriculo-ventricular bundle. It aids the cardiac mechanism when the auriculo-ventricular action is harmonious, and it tends to control the effects of the disturbance when the action is not harmonious.

There is one further distinction to be recognised in the muscular tissues of the heart—namely, between those whose function is primarily and essentially that of contraction, and those differentiated for the purpose of excitability, impulse discharge, and conductivity. Commencing at the sino-auricular (S.-A.) node, extending over the auricles (by a path

not yet defined),[1] forming the auriculo-ventricular (A.-V.) node and the auriculo-ventricular (A.-V.) bundle, we find a continuous strand of differentiated muscular tissue dealing with these special functions and not with contractility. As the branches of the auriculo-ventricular bundle penetrate to the remotest parts of the ventricles they are in a sense part of the muscle of the ventricles. But in the main function of the ventricles—contractility—they take no part. So that when we speak of supraventricular tissues clinically we include the auriculo-ventricular bundle as it takes no part in the muscular contraction of the ventricles.

Estimation of Importance of Cardiac Lesions.

It is useful in the case of an organ like the heart, which is subject to various diseases and disturbances, to have some standard by which to estimate the importance of the cardiac lesions. In the past attention has been largely concentrated on valvulitis as the predominating disease of the heart, and on murmurs as the evidence of valvular lesions. Students learned to classify cases according to the valve affected, mitral disease, aortic disease, &c., and proceeded later in their practice to carry out the treatment indicated in the text-books for the form of valvular disease present. It may be said that the best writers and teachers held no such limited views. References will certainly be found to changes in the myocardium, to dilatation and hypertrophy, and to irregularities of the heart. These, however, occupied a very subsidiary place, and the effect of their teaching and writing was to impress permanently on the student the idea that valvulitis is the important lesion in organic heart disease, and that prognosis and treatment are to be based on the valvular lesion present.

The fact that the heart is essentially a muscular organ; a force-pump, has long been recognised, but it is only recently that the great importance of disease of the myocardium has been emphasised. Heart disease may be summed up as a disturbance of the driving power of the cardiac muscle. Attention therefore may well be directed to the effect which disease processes have on the heart muscle. Gaskell and other physiologists have been struck by the wonderful mechanism by means of which any irregularity of heart beat experimentally induced is more or less corrected before the ventricular contraction occurs. He found that the main factor in the maintenance of cardiac efficiency is the securing of a regular ventricular beat. We may apply this in clinical medicine and say that the effect of cardiac disease is to be estimated by the extent to which ventricular action is affected. In disease we find that the action of the auricles can be dispensed with without failure of the circulation, and as regards the right ventricle any weakness there is chiefly of importance because of its effect on the action of the left ventricle. So we reach the conclusion that whatever the disease or disturbance present the important point to be considered is its effect on the driving power of the left ventricle.

In dealing with cases clinically, a standard such as this—the amount of interference with the action of the left ventricle—will be found useful in connexion with all forms of structural disease, valvular or myocardial; with all irregularities associated with myocardial changes; with all excessive changes in rate, be it very much increased or very much decreased; with the subjective symptoms and objective signs of cardiac weakness and cardiac failure; and very especially in connexion with the whole question of treatment. It may be said that our knowledge of the exact processes of disease is not yet full enough and precise enough to allow of the adoption of any such standard. But it is the recent advances in our knowledge which have made such a standard possible. It is the precision of knowledge gained through such instruments as the polygraph and electro-cardiograph, which has made possible the recognition of many influences, hitherto unsuspected, which act upon, and interfere with, the ventricular contractions. Of this examples will be given later. No doubt further progress will be made on the same lines, but it is useful meantime to have a working standard which will not play us false.

VALVULITIS AND VALVULAR LESIONS.

The view that valvulitis is the central factor in heart disease has proved misleading. Attempts were made to explain cardiac failure on a valvular basis by means of theories, supported often by great authorities, but not supported by much evidence. The theory of back pressure was held to be the explanation of cardiac failure in such different lesions as mitral stenosis, mitral regurgitation, and aortic regurgitation. The common signs of cardiac failure are familiar to all—namely, great dyspnœa, cyanosis, œdema, engorged liver, and oliguria. The explanation given was that the blood was either dammed back (mitral stenosis) or thrown back (mitral regurgitation), and that great back pressure in the venous circulation resulted. Hence came failure of the right side of the heart and also the so-called "failure of compensation."

In this connexion it is to be noted that all the phenomena of cardiac failure from "back pressure" can arise and do arise when a previously healthy heart is affected with the condition known as paroxysmal tachycardia. The valves may be normal, the myocardium may be healthy, but if the attack is sufficiently prolonged all the phenomena of "back pressure" may develop.

It is also to be noted that similar signs of heart failure may appear in many forms of chronic heart disease in the absence of any valvular lesion. The condition may end fatally, and after death no trace of valvulitis is to be found.

Further, we find clinically that urgent symptoms of cardiac failure may arise suddenly in cases of valvular disease without any apparent cause. The common and typical example is the development of auricular fibrillation in mitral stenosis. Here there is no sudden increase in back pressure, no alteration in the state of the diseased valve, but there is a sudden alteration in the rhythmic action of the heart which seriously affects the action of the left ventricle.

It is also to be observed that in the case of the gradual development of signs of cardiac failure in chronic valvular disease there is no evidence that the "back pressure" has been increased, or that the valve has become more inefficient. After 10 or 20 years the giving out of a heart with valvular disease is to be traced to something different from back pressure. Surely, if all the phenomena formerly associated with "back pressure" and the presence of valvulitis may arise when there is no back pressure and no valvulitis, some other explanation of the origin of these phenomena is called for.

The really important factor in all these cases would appear to be that the driving power of the left ventricle has given out, or that its efficiency has been interfered with by some superadded complication. It may be exhaustion from overwork, or from a defective blood-supply, or from the development of an abnormal rhythm, or from a great increase in rate. In all cases the signs of cardiac failure are brought about by a diminution of the forward pressure exerted by the left ventricle, and not by any form of increased back pressure. Such an explanation will at least meet most of the difficulties which the "back pressure" theory left unsolved. In using the term failure of compensation, which formerly had rather a hazy meaning, we ascribe the failure to the left ventricle, and we do not rest satisfied in the matter of diagnosis until we make out why it is that the ventricle has been rendered less efficient as a contractile organ.

Another point about valvular lesions, which are to be recognised by the accompanying murmurs, is that these murmurs may disappear or be replaced by others, or be much modified under certain conditions associated with cardiac failure. If the heart is beating rapidly an aortic regurgitant murmur may become inaudible for the time being. If the left ventricle is much dilated there may be audible only one murmur, that of mitral regurgitation, and this may be dependent on dilatation and not on disease of the mitral orifice. Perhaps the most striking example is the disappearance of the presystolic murmur of mitral stenosis when auricular fibrillation develops. The conditions under which the murmur or murmurs may disappear are often those which lead to the development of severe cardiac symptoms and the call for medical help. So that the physician who is dependent on valvulitis as his criterion will find that his guide has failed him at the critical moment.

None the less valvular lesions are sufficiently serious in themselves, and sufficiently important from a diagnostic point of view, to demand careful study. Our object is to determine not only what valvular lesion is present, but what

[1] "The exact morphological connexion between the sinus node and the auriculo-ventricular node has not been definitely established" (Wiggers).

effects of the lesions the patient is suffering from. The effects will be found very closely associated with the reaction of the lesion on the ventricles, sometimes the right ventricle, but much more frequently the left. Suppose that an aortic regurgitant murmur is heard. This denotes a reflux of blood into the ventricle after each systole. The murmur may be loud, but the reflux may be small. If we find no change in the size or impulse of the left ventricle, we are justified in assuming that the reflux is small in amount. The pulse will not be collapsing and the blood pressure will not be raised in systole and lowered in diastole as a result of the valvular lesion. Suppose, on the other hand, we find a collapsing pulse, and a high systolic blood pressure with a low diastolic pressure, as a result of this aortic lesion, we shall expect to find evidence of dilatation and hypertrophy of the left ventricle, and finding that we shall conclude that the amount of blood regurgitated is considerable. Similarly, the symptoms complained of by the patient, and any limitation of his cardiac response to physical exertion, must be carefully weighed in estimating the importance of a valvular lesion.

DISORDERED ACTION OF THE HEART.

The old views as to cardiac irregularity have been entirely replaced owing to new methods of investigation and the precise information gained through them. The possibility or, as we now know, the fact that the signs of cardiac weakness and failure might follow as the result of the irregularity does not seem to have presented itself until recently. Thus Balfour states: "Associated with any other valvular lesion irregularity must always be regarded as a symptom of cardiac failure." It was noted that in cases of cardiac failure from any cause an irregularity of the pulse was often present. It was further noted that many cases of severe cardiac failure showed a markedly irregular pulse and heart beat. From these observations the conclusion was drawn that in all cases cardiac irregularity was to be regarded as an indication that the cardiac power was failing, whether the disease was a general one, for example, typhoid fever or pneumonia, or one primarily affecting the heart, for example valvular disease. The irregularity was supposed to involve the whole cardiac action; there was no knowledge as to any precise localisation of the irregularity in the heart or as to the underlying changes in the myocardium.

The explanation of the uncertainty was not far to seek. To physicians symptoms are the clues of hidden disease, and the successful working up of clues is a powerful aid in diagnosis. On the other hand, a symptom which is not understood is a clue which leads nowhere, or possibly leads into error. Explanations were attempted as to the cause of the irregularity. Broadbent found that irregularity was the distinguishing feature of the pulse of mitral regurgitation. His explanation of the irregularity was the varying pressure to which the heart is subjected in inspiration and expiration, and the varying supply of blood to the ventricle thus induced in the presence of mitral regurgitation. It is interesting to compare these views with those of Balfour. The latter says:—

> Like all other cardiac cases, those with mitral stenosis come to us as patients when compensation fails; an early result if not also a cause of this is defective nutrition of the myocardium, and as a consequence irregularity of the heart's action and of the pulse, more marked in this form of cardiac affection than in any other, and often amounting to a veritable delirium cordis.

We have now reached the stage at which the great majority of cardiac irregularities have been analysed and classified. The special types can be demonstrated by means of the polygraph and the electro-cardiograph. Irregularities which have no significance or importance can be separated from those which have both significance and importance. These are great advances from the student's point of view. What seems to be the chief discovery is that certain irregularities are directly responsible for an increased rate of the heart and an inefficient heart beat, from which signs of cardiac failure follow sooner or later. The heart is usually affected with disease previously and the irregularity follows, but the irregularity is the cause of such a disturbance in the cardiac functions that the previous lesions may be entirely obscured and fresh symptoms develop. Some irregularities, on the other hand, are of no significance or importance as regards the cardiac functions. If we wish to form an estimate as to the importance of a cardiac irregularity we can employ as a standard the effect it has on the driving power of the left ventricle. We can observe, when an irregularity develops, the appearance of fresh cardiac symptoms, of changes in the heart itself, and it may be of progressive heart failure under the continuance of the irregularity. On the other hand, we can observe the return of the heart to its previous condition and the disappearance of the added symptoms when the irregularity ceases. In the field of therapeutics we have also to deal with irregularities, and a wide sphere of usefulness is now open for the employment of remedies in checking the injurious effects of irregularity on the action of the left ventricle.

In the past, clinical records of cases in the hospital wards or in publications frequently contained the words "the heart was irregular" or "the pulse was weak and irregular." The fact was noted, and if any inference was drawn it was to the effect that the irregularity was a bad sign. Now we expect an observer to state what form of irregularity is present, and to designate its probable site of origin, and to form an opinion as to the significance to be attached to it. For this purpose I should like to urge strongly that all students should be taught how to use the polygraph and the electro-cardiograph in the analysis of cardiac irregularities. They may not be able to possess them in their practice later on, but, speaking generally, they will be able to apply what they have already learned by using the ordinary bedside methods of examination. When once they have been able to take and study records from cardiac irregularities in cases under their own observation, they will have a much better mental realisation of the meaning and significance of these irregularities. In my student days we were taught the use of the sphygmograph, and many tracings were taken of different forms of irregularity. But the pictures were meaningless; we did not understand how the irregularity was produced or where it was produced, or what was its significance, if any. At the present time instrumental methods supply the key to these hidden mysteries, and a practical knowledge of these instruments will, I am convinced, be of lasting benefit to the medical student.

Disordered action of the heart may be of two kinds—namely, (1) disturbance of rhythm and (2) disturbance of rate. Either may be present alone or both may be present at the same time. Further, the rhythm of the heart may be disturbed without any interruption of the ventricular regularity, as is seen in cases of complete heart-block and auricular flutter, so that we may feel a regular pulse, listen to a regular ventricular beat, and yet be dealing with a case in which the rhythm of the heart is irregular and the irregularity is productive of definite signs of cardiac weakness. Again, the rate and regularity of the ventricular beats may be quite normal, and yet the auricular rate may be three or four times as great. This is seen in connexion with auricular flutter.

There are many forms of disordered action of the heart which were elucidated by means of graphic records. They seem complicated and have required a new nomenclature. Fortunately, they are often accompanied by distinctive clinical signs or symptoms, so that their recognition by ordinary bedside methods is steadily being rendered more easy.

There is a close interaction between disturbances of rate and of rhythm, so that the two might always be considered together in the clinical study of a heart case. An increase of rate or an irregular action is not necessarily an indication of a diseased heart; either may occur in a sound heart or in the functional disturbance of a sound heart. But in the case of heart disease of any type, presenting symptoms of cardiac failure, it may be said that some disturbance of rate or rhythm will very often be present. Further, it will usually be found that the symptoms of distress from which the patient is suffering are the result of this disturbance of rate or rhythm or, to be more precise, of the impairment of the functional activity of the left ventricle induced by the disturbance.

IRREGULARITY OF RHYTHM.

An irregularity of rhythm may be present without any injurious reaction on the heart, without, in short, any significance whatever. Of this class the commonest type is the sinus irregularity associated with respiration, in which the rhythmic discharge of impulses from the sino-auricular node is irregular. It is of no importance because it does not

affect the normal sequence of cardiac contractions in the different parts of the myocardium.

Extra-systoles.

Another form of irregularity may, under certain conditions, be considered as of no importance. An extra-systole is a very common irregularity in elderly people, who present no other indication of heart changes apart from those of old age. There is here a definite disturbance of the cardiac rhythm, occurring occasionally. The point of importance would seem to be that the extra-systole occurs so infrequently that the effect on the action of the left ventricle is negligible. Suppose it occurs every fifth beat when the heart-rate is 75. We shall then have 60 normal contractions per minute to 15 abnormal. The frequency of the abnormal contraction is not sufficient to disturb the efficiency of the ventricular action. Under these conditions therefore the presence of an irregularity may be of no significance, although under other conditions, that is great frequency of recurrence, the same irregularity may seriously disturb the cardiac action and power.

The extra-systole or premature contraction has been the subject of much study within recent years. It has been suggested by Lewis that such varied conditions as paroxysmal tachycardia, auricular flutter, and auricular fibrillation have as their pathological basis the same condition as that which gives rise to the solitary extra-systole. But the cause of an extra-systole is still to be found. It arises under such a multiplicity of conditions that one is led to wonder whether there is any pathological importance to be attached to the solitary extra-systole. It can be produced artificially in the laboratory; it is found in childhood and old age; it may be present in an otherwise healthy heart and in one which is diseased; it is associated with temporary nervous disturbance—for example, neurasthenia, with toxic conditions, and with the convalescent stage of many illnesses; it may occur only on exertion or only during rest, while the patient is standing up or only when he is lying down; and it may arise through the action of the vagus or through the action of digitalis. The list may be indefinitely prolonged. So far it has been determined that the extra-systole always arises at some abnormal spot in the heart—that is, not at the normal starting-place, the sino-auricular node. It is assumed by most writers that it is the result of an abnormal irritability, an increase of functional activity at some focus in the heart. This local overactivity leads to a premature impulse-discharge and contraction before the normal cardiac cycle starting at the sinus has begun. It may, however, be argued equally plausibly that there has been a depression of activity, a block in the conduction at some spot which, after a brief delay, initiates a contraction on its own. At present neither the one nor the other assumption can be proved or disproved.

Auricular Fibrillation.

There is no form of cardiac irregularity which is of more importance, both from its frequency and its gravity, than auricular fibrillation. It is interesting to note that when Balfour and Broadbent were discussing cases of extreme cardiac irregularity they were dealing with cases of auricular fibrillation. The serious symptoms associated with "failure of compensation" and "ruptured compensation" were clearly due to the same cause. The great benefit which followed the use of digitalis in heart disease was notably obtained in a certain type of case which we should now describe as auricular fibrillation. The facts are clearly shown in the clinical records of the past.

The clinical conditions which mark the onset of auricular fibrillation were noted, although not understood, by previous writers, and were found to arise most commonly in association with mitral stenosis. Certain stages in a case of mitral stenosis were accurately observed, and in the last stage peculiar features were commented on. For example, it was found that the second sound at the apex had disappeared. One explanation of this was that the enlarging right heart had so displaced the left ventricle backwards that the second sound became inaudible. Another fact noted was the disappearance of the presystolic murmur, and this was ascribed to the development of tricuspid regurgitation, and the diminished pressure in the pulmonary circulation and left auricle which followed. These facts as observed were correct, but the attempted explanations had rather an academic interest because their bearing on the cardiac disturbances which accompanied them was not understood.

The recognition of the importance and frequency of the presystolic murmur, as described by Gairdner, was slow. The same may be said about auricular fibrillation. Yet auricular fibrillation is more than a name—it is a landmark in the advance of medicine. For the student the subject of cardiology will be rendered easier when he has watched and learned (1) the earlier stages of mitral stenosis, (2) the progress up to the onset of auricular fibrillation, (3) the clinical phenomena of auricular fibrillation; and (4) the results of its treatment by means of digitalis.

The history of the discovery of the condition now known as auricular fibrillation is worth repeating. A practitioner in Burnley—whom we now know as Sir James Mackenzie—had made out by means of his polygraph a method of recording the pulsation of the right auricle in what is known as a "jugular" or "venous" tracing. Under conditions of health and in many cases of disease this took a certain form showing definite waves or peaks. One of his old cases of mitral stenosis suddenly developed signs of heart failure, with extreme irregularity of the pulse. With this, as he had noted in other cases, the presystolic murmur disappeared. On taking a venous tracing he found that all trace of auricular contraction had also disappeared and that apparently the right auricle was not acting. Here, then, was the explanation of the disappearance of the presystolic murmur—the auricle was not contracting. The exact condition present was determined later, Cushny pointing out that the jugular and arterial tracings from dogs in experimentally produced auricular fibrillation resembled closely the peculiar jugular pulse and irregular rhythm in the human subject. Lewis proved later by means of the electro-cardiograph that the condition in the human subject was identical with the so-called auricular fibrillation in animals. I do not suppose that Mackenzie had at first any idea of the importance of his discovery, which has only been emphasised by subsequent work. In one thing he was singularly fortunate, for he had not only found the key to many previously unexplained cases of cardiac failure, but he had made it possible to employ digitalis with knowledge and with precision, a fact which he himself was the first to recognise and take advantage of.

For clinical purposes the two conditions of auricular flutter and auricular fibrillation may be considered together as being varieties of a disturbed action in the rhythm of the heart which have a common basis. In flutter definite although weak contractions, but of a different kind from the normal ones, are still taking place, while in fibrillation they are absent. In flutter the ventricular contractions may be regular or irregular for longer or shorter periods, usually they are regular; in fibrillation they are always irregular. In flutter the auricles may be contracting at the rate of from 150 to 300 per minute, possibly more; in fibrillation certain obscure muscular movements are detectible by the electro-cardiograph and are usually at the rate of from 300 to 600 or more per minute.

In connexion with chronic heart disease both conditions—fibrillation and flutter—tend to recur and finally to become permanent. In acute heart disease (rheumatic) an attack of either condition may be merely a temporary manifestation of active carditis. In acute and early heart disease flutter and fibrillation are rare, but some cases have been described, and even in quite young subjects. As a general rule flutter and fibrillation are associated with heart disease of some standing—for example, cases of mitral stenosis of considerable duration and of rheumatic origin or degenerative changes from cardiac sclerosis in elderly persons.

Symptoms Associated with Auricular Flutter and Fibrillation.

These two conditions, flutter and fibrillation, do not represent a form of heart disease, but a complication occurring in the course of heart disease. The normal rhythm of the heart has been disturbed, and the importance of the disturbance may be measured by the effect which the development of fibrillation or flutter has on the action of the left ventricle, and to a less extent of the right ventricle. The symptoms which follow are dependent on the response which the left ventricle is capable of making in the presence of this disturbing factor.

As a matter of clinical experience it will be found that in some cases the onset of auricular fibrillation will not be

characterised by any fresh symptoms which attract the patient's attention. In other cases, what the patient notices is the irregular action of the heart, without any added symptoms. In other cases the patient is conscious of increasing breathlessness on exertion or even at rest, and a marked limitation of his previous cardiac power. In other cases the disturbance of the cardiac action is sudden and profound, and the signs and symptoms are those of acute heart failure.

The nature of the symptoms which follow the onset of fibrillation or flutter will depend on several different factors. As already stated, the important point is, how does the left ventricle respond to meet the embarrassment caused by the new rhythm?

One factor of importance is the rate of the ventricular contractions which follows the onset of fibrillation. Unless some damage is present in the junctional tissue (A.-V. node and bundle) an increase in the rate of the ventricular contractions frequently follows, and the greater the increase the more marked will the symptoms of distress be. Thus with a ventricular rate of 150 per minute the symptoms will probably be more urgent than with one of 120. The importance of this increase may be assumed when we consider that a damaged heart, carrying on the circulation with more or less difficulty at a rate of 75 per minute, suddenly has its resting and recuperative period of diastole diminished by one-half, and its contractions doubled in number when the ventricular rate runs up to 150 per minute. The importance of this increase is demonstrated by the therapeutic results which follow from a slowing of the cardiac rate, as will be shown later.

A second factor which has to be considered is the irregular action of the ventricle. This irregularity is the result of the impulses proceeding from the auricles reaching the ventricles in an irregular manner owing to a disturbance of conductivity at the auriculo-ventricular node and bundle. The ventricle is filled irregularly, it is stimulated irregularly, and it contracts irregularly. There is thus a further loss of driving power and force, many of the ventricular contractions being so feeble that they cannot be recognised by feeling the radial pulse. While a regular rate of 150 beats per minute will tend in time to exhaust the ventricular force, a condition of exhaustion will be induced more rapidly when gross irregularity is superadded, as occurs in auricular fibrillation. It has seemed to me that the development of symptoms of acute heart failure is more common with fibrillation than with flutter, and this may be explained by the fact that although in the latter the ventricular rate may be as rapid, the element of irregularity is usually absent or much less marked.

A third factor is the state of the myocardium of the left ventricle at the onset of fibrillation. If the myocardium is healthy, or hypertrophied and powerful, the response will probably be good, and the symptoms not severe. If, on the other hand, the myocardium is much weakened by disease, the response will be less satisfactory. If the heart has been carrying on the circulation efficiently before the attack, although it has been diseased, then the disturbance which follows, although it may be severe at first, will probably yield readily to rest and treatment.

The clinical symptoms associated with the progress of auricular fibrillation were recognised 20 years ago. They were ascribed to cardiac failure, and it was noted that the pulse and heart were irregular. Now we ascribe the symptoms to the presence of an irregular rhythm of the heart—auricular fibrillation—and we can explain how the symptoms follow from this irregularity. Here is a description of the symptoms of auricular fibrillation by one of my predecessors which could not be bettered in the present day, although it was written for quite a different purpose.

> When irregularity of the pulse is a marked feature, when a few beats are large and turbulent, to be followed by several small beats, when the pulse no longer corresponds in number with the cardiac contractions, when the heart itself shows signs of hypertrophy and extending dilatation of both ventricles with dullness extending upwards over the conus and left auricle, when the neck veins become full, fill from below and pulsate, the liver enlarges, the cellular tissue becomes dropsical, the lungs congested, and the urine scanty—with these symptoms and signs we have with increasing urgency the conditions calling for digitalis. (Sir Douglas Powell.)

Acute Development of Auricular Fibrillation and Rapid Cardiac Failure.

These chronic and progressive forms of auricular fibrillation are very common, and are recognised as such at the present time. I do not think that the acute development of auricular fibrillation and rapid cardiac failure is so generally recognised. One reason is that the cardiac conditions from the point of view of sounds and murmurs may be entirely obscured by the accompanying developments, as in the following cases.

A carman, aged 46 years, was admitted to hospital in a state of extreme respiratory distress. The history was that the same morning, about 8 o'clock, he had complained of a painful feeling of tightness in his chest. This was followed almost immediately by a difficulty in breathing, which gradually became worse until he was unable to move or exert himself in any way. The patient was breathing with extreme difficulty, unable to lie down, and the respirations were slow with prolonged wheezing expiration. The face and lips and hands were very cyanosed. The pulse was feeble and irregular, at the rate of 130 per minute. The heart sounds could not be heard owing to the loud rhonchi and râles which filled both lungs. The cardiac apex and the cardiac borders could not be determined. The liver was much enlarged. Various diagnoses were made as to the cause of his condition and to meet these the treatment was also varied. Venesection was performed to half a pint, and he received injections of morphine, atropine, strychnine, adrenalin, and ether, while brandy was given freely. I saw him six hours later, when his breathing was considerably easier. The pulse was of the grossly irregular type, beats of different strength being mixed up in a hopeless jumble. A pulse-tracing showed this well. A venous tracing could not be taken owing to the overaction of the neck muscles.

The history subsequently obtained was that he had had rheumatic fever 30 years previously, and had been discharged from the Navy 15 years previously because of heart disease. Since then he had been driving a two-horse van, a form of occupation sufficiently arduous. He had had no cardiac symptoms until three weeks previously, when, while lifting a heavy weight, he was seized with a severe pain across his chest and in the left arm, the power of which was lost. He recovered entirely in three days and resumed work, which he continued until seized with the present attack.

When the respiratory distress had quieted down it was possible to make out the cardiac condition. The rate had slowed down under treatment but the action was still irregular. The presence of auricular fibrillation was demonstrated by means of electro-cardiograph and polygraph tracings. The heart was much dilated and there were some powerful beats felt amongst many weak ones. The signs of mitral and aortic regurgitation were present. As is usual in such cases, rapid relief from all distressing symptoms soon followed after the heart was slowed, and the patient was able to be up and about.

There was little doubt that in this case the heart, although damaged by disease of many years' standing, had not shown any signs of actual failure until the sudden onset of auricular fibrillation. The symptoms of distress, taken along with the typical irregularity of the pulse, were sufficient to allow of a diagnosis being made. The condition of auricular fibrillation persisted during the following two years, after which the patient passed from observation. During this time the patient was always free from urgent cardiac symptoms when his heart-rate was controlled by digitalis.

A boy, aged 13, was a hospital patient owing to heart disease. He had had rheumatic fever at the age of 4½ years and on several occasions later on. He had been admitted to hospital several times because of shortness of breath and general weakness. The heart was greatly enlarged, on the left side especially, and the heaving action there suggested hypertrophy. The enlargement was ascribed to aortic regurgitation, a well-marked diastolic murmur being present at the base. The pulse was typically collapsing and the rate was from 100 to 110. After a short rest in the hospital he was usually able to take a moderate amount of exercise without discomfort.

On Nov. 14th, 1914, after running, he became very short of breath and complained of pain in the left side of the chest. He went home, and his mother noticed that he was very blue and cold. The breathing became worse and he was admitted to hospital. On admission he showed cyanosis, great dyspnœa, and anxiety. The dyspnœa was so great that a venous tracing could not be taken. A radial tracing showed a ventricular rate of 220 beats per minute, perfectly regular, and naturally a small pulse-wave. The cardiac condition determined was one of great dilatation, the apex

being in the seventh intercostal space 4 inches outside the nipple line. The right side of the heart was also considerably dilated. Over the whole præcordia a systolic murmur was audible. The liver was very much enlarged, the temperature was subnormal, and the respirations were 50 per minute. A short, hacking cough was very persistent and numerous râles and rhonchi were audible on auscultation. He was ordered digitalis.

Four days later he was somewhat easier but still suffering from dyspnœa and anxiety, but the cyanosis was less. The pulse-rate was 200, but for a short time during the day it had fallen to 100. The ventricular action was at times perfectly regular and at other times hopelessly irregular. Venous tracings suggested strongly a condition of auricular flutter when the heart's action was regular and of auricular fibrillation when it was irregular. He had taken ten doses of Nativelle's digitalin (gr. 1/240 sing.).

Ten days after admission the boy was free from all discomfort. The cardiac rate was 100 and the action was still irregular, the condition being one of auricular fibrillation. An aortic diastolic murmur was clearly audible and the pulse was collapsing. He had taken 18 doses of digitalin in seven days, when it was stopped because of vomiting. The signs of pulmonary and hepatic engorgement had passed off.

He remained a month in the hospital and was completely relieved of all acute symptoms. The auricular fibrillation persisted. A month later he was readmitted in a condition of acute cardiac failure very similar to the previous attack. The pulse was uncountable, but auscultation showed a cardiac rate of about 200, and very irregular action. On Jan. 12th the cardiac rate was 200. On the 13th, after three doses of digitalin, the rate was 120. On the 14th, after seven doses of digitalin, the rate was 84. On the 15th, after eleven doses of digitalin, the rate was 68. Vomiting occurred and the digitalin was stopped. With the slowing of the cardiac rate there came (1) the disappearance of all dyspnœa and anxiety; (2) the reappearance of the diastolic aortic murmur and the collapsing pulse; (3) no evident change in the size of the heart; (4) a clearing up of congestion in the lungs and liver. The auricular fibrillation did not pass off.

He was discharged on Feb. 2nd, quite able to take moderate exercise without discomfort. The advice given to continue his digitalis regularly was probably not followed. He was readmitted on July 12th in much the same condition as before, and died within a few hours. The autopsy records state: the heart is enormous; all the cavities are dilated; the ventricles are much hypertrophied; the pericardium is generally adherent; the mitral valve is much dilated; the aortic valve is incompetent.

Attacks of cardiac failure such as occurred in these two cases would have been described in the phraseology of former times as due to "broken compensation," and would now be described as due to "the onset of an abnormal rhythm," which in these cases was auricular flutter or fibrillation. The term "broken compensation" did not convey much information as to the cardiac changes, and so treatment was guided by the general signs and symptoms—an empirical treatment, even if often singularly successful. Now our treatment is directed to the cardiac changes, and more especially to the effect which these produce on the efficiency of the left ventricle, and the advantages of this will be considered later on.

I should like to go a little further and say that the term "failure of compensation" is actually wrong in such cases, because the compensatory changes have not broken down. Reference has already been made to the automatic action of the heart which maintains the circulation in the presence of valvular lesions, adherent pericardium, arterial disease, &c. The compensatory changes which have automatically taken place in the heart under these conditions do not break down at the onset of an abnormal rhythm like auricular fibrillation. They are there, and are still efficient if given suitable conditions for their action. This is shown by the fact that if the abnormal rhythm ceases or if its effects are removed by treatment the compensatory changes are found to be as efficient in carrying on the circulation as they were before.

TAUNTON AND SOMERSET HOSPITAL.—The annual meeting of the governors of this charity was recently held. The medical report was satisfactory. The financial statement showed that after appropriating legacies of £1310 there still remained an unfavourable balance of £2207. The committee regretted that Dr. A. E. Joscelyne had resigned from the honorary surgical staff. The Hon. H. E. Portman was re-elected president, and at the meeting he gave £1000 towards reducing the deficit balance of the hospital.

ANTHRAX: SIMULATING CEREBRO-SPINAL FEVER.

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(*Report to the Medical Research Committee.*)

Cerebro-spinal fever, now prevalent in various parts of the country, is to most of us a disease of which we have had little previous experience, and one that is so protean in its manifestations that it is not surprising to find that mistakes in its diagnosis frequently occur. Confusion as to its recognition may happen in illnesses accompanied by toxæmia associated with acute infective processes, or in certain acute cerebral diseases of primary origin and in meningitis due to causes other than meningococcal infection.

While, on the one hand, cases of cerebro-spinal fever have been mistaken for influenza, typhoid fever, pneumonia, measles, rheumatic fever, acute poliomyelitis, epilepsy, tuberculous meningitis, acute appendicitis, and other maladies; on the other hand, such diseases themselves have been regarded at times as cerebro-spinal fever. The following notes refer to five cases which were primarily thought to be cerebro-spinal fever, but which proved ultimately to be acute anthrax. The series is published at the request of the Medical Research Committee and with the consent of the Director-General, Sir Alfred Keogh.

Three of the cases occurred among soldiers and two among civilians, the former coming to my notice in connexion with the returns made to me of cases of cerebro-spinal fever among troops; for particulars of the civilian cases I am indebted to Professor S. Delépine and Dr. John Ritchie.

The number of cases in which the diagnosis of anthrax has rested on the examination of the cerebro-spinal fluid is, I imagine, very small. Dr. Ritchie has directed my attention to the fact that Pollak[1] appears to have been the first to describe such a condition.

CASE 1.—The first case in the series was that of a Yeomanry Lance-Corporal, aged 29, reported upon by Captain J. H. Beilby, R.A.M.C.(T.), the bacteriological investigation being carried out by Professor Walker Hall in connexion with the inquiry in regard to cerebro-spinal fever undertaken by him for the Medical Research Committee. The patient was in Camp C from April 27th to June 19th, 1915, and was away on leave from June 5th–7th at a farm at B. While in camp he slept on a ground sheet on the grass floor of a tent. On June 17th he complained of malaise and shivering; the next morning he had a temperature of 100° F. and a red catarrhal-looking condition of pharynx and fauces. On the 19th he woke in a state of delirium at 6.30 A.M. and at 6.40 A.M. was semi-comatose, semi-delirious, with signs of cerebral irritation, photophobia, a tendency to curl himself up and to burrow his head backwards, these symptoms persisting during the day. At 7 A.M. a copious involuntary action of the bowels occurred, consisting of loose fæcal matter. At 8.30 A.M. there was another loose evacuation, the fæces being mixed with a considerable quantity of blood. A provisional diagnosis of cerebro-spinal meningitis was made. At 1 P.M. lumbar puncture was performed. The cerebro-spinal fever fluid was clear and not under pressure. It contained neither cells nor exudate, and on arrival at the laboratory it was found to be unsuitable for examination. At 5 P.M. the temperature was 99·8° and the pulse 66, slightly irregular. There was photophobia, the pupils being equal and contracted. The head was not retracted, although retraction was present at 4.30 P.M. During the night the patient was restless and violently delirious. On June 20th he recovered consciousness, answered questions, passed urine at will, and recognised his father. He complained of headache and pain in the lower cervical region. During the day quiet delirium alternated with conscious periods. The bowels failed to act in spite of 1-grain doses of calomel every three hours and 2 grains at longer intervals. The pulse was slow and regular, the temperature remaining normal.

On June 21st the condition was similar, but the pain in the head and neck was still considerable. After an enema an action was obtained, the stool being free from blood and mucus. Late in the day the temperature rose to 101°. On the 22nd lumbar puncture yielded a small quantity of clear fluid, which was not under pressure and did not contain any exudate, cells, or organisms. No cultures were made. On the 23rd the temperature continued to rise,

[1] Pollak: Wien. klin. Wochenschrift, 1912, p. 1702.

reaching 103°. The general symptoms were the same, but the headache and cervical pain increased. At 6.15 P.M., when seen by Professor Walker Hall, the patient was semi-conscious, but when roused exhibited clear perception and appreciation of his surroundings. He showed slight retraction of the head and rigidity of the entire muscles of the back. The reflexes were a little exaggerated, and there was some increase in surface sensitiveness. Kernig's sign was doubtful, spots were not visible, the pupils were equal, and the ocular muscles acted well. Tache cérébrale could not be obtained; signs of cardiac or pulmonary lesions were absent. An opportunity to investigate the urine and stool did not occur. The following blood and other examinations were then made.

Blood examination (June 23rd).—The blood count showed 4,200,000 red corpuscles and 16,000 white cells. Hæmoglobin 60 per cent. The differential count yielded: polynuclears, 80 per cent.; eosinophiles, 2 per cent.; large mononuclears, 10 per cent.; small mononuclears, 8 per cent. The blood serum did not contain any agglutinins for paratyphoid A or B. Vaccination against typhoid had been carried out in January, 1915. *B. coli* were agglutinated 1 in 10, and 1 out of 7 strains of streptococci showed slight clumping in 1 : 25 dilution.

Blood culture (June 23rd).—Blood was transferred directly from the vein into various culture media. It was examined daily for seven days, but remained sterile.

Lumbar puncture (June 23rd).—Six cubic centimetres of yellow slightly blood-stained fluid were obtained in two sterile centrifuge tubes. It was not under pressure. Within three minutes a slight clot was formed. The contents of one of the tubes was used for film examinations. It did not show any exudate cells or any micro-organisms. The other 3 c.c. were used for cultural purposes. One portion was transferred to suitable media; the remainder of the fluid was injected into a mouse. Thirty hours later the mouse was dead and showed the classical appearance of anthrax infection, while the cultures of spinal fluid yielded a Gram-positive, spore-bearing non-motile rod, which grew anaerobically and aerobically, liquefied gelatine, and showed typically spiked outgrowth; on potato giving a growth at first white and later reddish brown; in broth growing without scum with a granular thready deposit and on plates and other media exhibiting definite colonies with outgrowing threads curving inwards again to the colony. A small dose of the culture from the spinal fluid was injected into a guinea-pig (230 grammes). The animal died in 20 hours. The characteristic œdema at the site of inoculation, serous hæmorrhages, and enlarged spleen were all present. Cultures made from the area of infection, from the heart blood, and from the spleen all yielded pure cultures of anthrax bacilli. Naso-pharyngeal swab (June 23rd): A naso-pharyngeal swab showed Gram-positive cocci only. Films from naso-pharyngeal material did not disclose any phagocytosis of Gram-negative or Gram-positive organisms.

On June 24th the temperature fell a little and the cervical pain was somewhat less, but there was retention of urine. On June 25th the temperature fell further; at 3 A.M. the patient had an inclination to micturate, but was unable to do so. In the words of the orderly in attendance "he complained of feeling numb in feet, legs, and thighs, and could not lift his arms." At 7.30 A.M. the next day he coughed violently, then collapsed, and died at 7.45 A.M. A necropsy was not obtained.

Remarks by Professor WALKER HALL.—"Although vomiting was not present, the symptoms on June 19th were sufficiently suggestive to be considered by Captain Beilby and Lieutenant Wilkinson as indicating the presence of cerebro-spinal fever. There was no sign of cut, wound, or abrasion, or any local manifestations of anthrax. As it was not possible to arrange for a post-mortem examination, the original focus of entry of the bacillus could not be ascertained. The blood showed a definite polynuclear response to an acute infection, although it did not yield a growth of the organism at the time of culture. Apparently it had passed out of the blood for the time being and was localised in the cerebro-spinal canal. Because of the unusual occurrence, the whole of the technics adopted were rigidly subjected to the closest scrutiny and criticism; there seems to be no doubt, however, of the presence of the *Bacillus anthracis* in the deeply yellow-coloured cerebro-spinal fluid. Once this is accepted, the symptoms may be accounted for by the occurrence of pia-arachnoidal hæmorrhages similar to those which have been described in connexion with fatal cases of anthrax infection. The origin of the infection was not defined. In the district which the patient visited from June 5th to 7th, cases of anthrax have not occurred. The man had not been on duty in the horse sick lines, and his own horse was well. The lack of examinations of blood, urine, &c., owing to the early death of the patient makes this record incomplete, but it may serve as a purpose in directing attention to the possibility of similar cases."

As this was the first of its kind to come under notice the case was submitted to close investigation. It is a matter for regret that no post-mortem examination was obtained, and that the materials sent to Professor Walker Hall up to June 21st were not suitable for examination other than microscopical. The sterility of the blood and the presence of anthrax in the cerebro-spinal fluid were conditions so unusual as to call for rigid examination of any possible or probable source of fallacy. The only recorded case of anthrax in the neighbourhood was that of the cow on a farm 12 miles from the camp where the man was stationed. This case was seen by the local veterinary inspector, and his diagnosis of anthrax was confirmed by the Board of Agriculture and Fisheries. No material from this cow or from elsewhere at this time was examined at the Bristol University Laboratory. It was not possible to establish any connecting circumstances between the soldier's attack and this cow.

The only anthrax at the laboratory was a culture kept among the stock cultures in a special room and not touched save for reinoculation on the first of each month.

The patient died a few hours before Professor Walker Hall established the diagnosis, and the death was returned as due to cerebro-spinal fever.

CASE 2.—Lance-Corporal R. P., aged 22, Royal Engineers, was stationed at Fenny Stratford, Bucks. He was on stable picket on May 19th, 1916, and on the 20th came to London and was billeted in a northern suburb. From the 22nd he was one of a class of about 30 men under instruction in signalling at the G.P.O., Aldersgate-street. On the 25th he felt cold and went to bed complaining of pain in the left side of his chest. He slept well, but remained in bed on the 26th, the pain in the left side having extended to the left shoulder, but on the whole he felt better. On the 27th at 4 A.M. he suffered from frontal headache and still complained of pain in the left side. At 5.15 A.M. he was seen by Dr. Bremner, a local practitioner, who gave him medicine, which, however, he vomited. The same day he was removed as a case of cerebro-spinal fever to the isolation ward at the City of London Military Hospital, where he arrived in a state of coma and died the same evening at 9 o'clock.

Lieutenant W. J. Tulloch, R.A.M.C., military bacteriologist of the London Command, was asked to examine the patient with a view to determining whether the case was or was not one of cerebro-spinal fever. The man died at the hour of Lieutenant Tulloch's arrival at the hospital. The following account of the patient's condition was furnished by Lieutenant Tulloch:—

Examination of the body.—The body was that of a well-nourished man. There was no evidence of external violence. No deformities or recent sores of any kind were noted beyond a slight abrasion over the left patella. On Saturday, between 12 noon and 12.45 P.M., he is known to have fallen. Petechial hæmorrhages were present over the upper part of the thorax, both anteriorly and posteriorly, also over the external aspects of the upper limbs, notably around the elbows. A few petechiæ were also found on the extensor aspects of the lower limbs, notably over the quadriceps extensor muscles. These petechiæ were dark purple in colour and averaged from one-eighth to a quarter of an inch in diameter. A lumbar puncture was performed and about 10 c.c. of fluid containing blood was drawn off. This material was taken to the laboratory at Millbank at once and was examined. Organisms having the morphological characters and staining properties of the *B. anthracis* were present in large numbers and a provisional report of "septicæmic anthrax" was given by telephone to the medical officer in charge of the case. Cultural examination confirmed this finding, and a post-mortem examination was arranged for Monday, May 29th, at 12 noon.

Post-mortem examination.—1. General appearances: Beyond what is noted in the previous paragraph nothing of import was found. Special attention was paid to the question of the presence of malignant pustule, but exhaustive examination failed to show such a sore. 2. Thoracic organs: On opening the thorax the pleuræ were found to be filled with clear straw-coloured fluid, about 20 ounces on the left side and about 30 ounces on the right. This fluid was shown on microscopic and cultural examination to contain *B. anthracis*. The pericardium contained about 7 ounces of similar fluid. The anterior margin of the left lung was bound by recent adhesions to the chest wall. No hæmorrhages could be found on the pleuræ or pericardium. Heart: The heart was normal in size and no valvular lesions were present, but the cardiac muscle was very flabby and showed cloudy degeneration. Some heart blood was drawn

off with precautions to ensure sterility. Microscopical and cultural examinations showed *B. anthracis*. Lungs: The left lung was dense and hæmorrhagic, and on section its condition was seen to resemble that of "splenization." No alveolar air could be expressed from the cut surface, while inter-lobar adhesions united the lobes of the organ. The right lung was markedly hyperæmic, but from its cut surface air and serous exudate could be expressed. The serous exudate was shown on microscopical and cultural examination to contain *B. anthracis*. The trachea and bronchi: The mucosa of the trachea and bronchi was deeply injected and very small submucous hæmorrhagic areas were present. At the bifurcation of the trachea and in the larger bronchi there was present blood-tinted secretion, which on microscopical and cultural examination was found to contain *B. anthracis* and pneumococci. 3. Abdominal organs: The peritoneum was injected but no hæmorrhages were noted. The spleen was large, weighed 15 ounces, and was dark in colour and flabby. On section it was found to be diffluent. The spleen pulp was examined and found to contain *B. anthracis* in large numbers. These were recovered on cultivation. The liver was normal in size and colour, but showed evidence of commencing cloudy degeneration. The kidneys were normal in size, the capsule stripped easily, and a few subcapsular petechiæ were found. On section these organs showed nothing of pathological import beyond evidence of cloudy swelling. The other abdominal organs also showed evidence of cloudy degeneration. The stomach: This organ was empty, and large areas of the mucosa were intensely congested and showed extensive submucous hæmorrhages, notably towards the pylorus. Intestine: The upper part of the intestine showed no evidence of pathological change. Careful examination was made to exclude the possibility of the case being one of gastro-intestinal mycosis. The bladder: This organ was full and it was decided as a point of scientific interest to examine the urine. It was found to be sterile. The cranial cavity: This was not opened, but a cervical puncture was performed. Again blood-stained fluid containing *B. anthracis* was obtained.

Summary.—(*a*) Evidence of general septicæmia; anthrax bacilli isolated from pleural exudate, bronchial exudate, spleen, heart blood, and cerebro-spinal fluid. (*b*) Widespread, hæmorrhagic consolidation of the left lung with deep injection of tracheal and bronchial mucosa; some hyperæmia of the right lung. (*c*) Great enlargement of spleen. (*d*) Deep injection of, and submucous hæmorrhage in, the gastric mucosa. Absence of definite evidence of intestinal mycosis. (*e*) Cerebro-spinal fluid hæmorrhagic and contained *B. anthracis*.

Conclusions.—1. The cause of death was septicæmic infection with *B. anthracis*. 2. There is no evidence that the route of infection was by way of the skin, or gastro-intestinal mucosa. There was, on the contrary, evidence that the infection was primarily bronchial.

Report of histological examination of internal organs.—1. Lung: This organ shows a hæmorrhagic broncho-pneumonia. The alveoli in the affected parts are filled with blood. Over the pleural surface there is a hæmorrhagic deposit. Sections stained to demonstrate organism reveal the presence of *B. anthracis* in large numbers within the alveoli and along the lymph capillaries, while neighbouring blood capillaries are seen to contain but few bacilli. 2. Gastric mucosa: The hæmorrhagic condition of the mucosa is found to be submucous, and few organisms are found within the capillaries. The epithelium around the hæmorrhagic patches is necrosed. 3. Heart: The cardiac muscle shows definite evidence of pigmentary degeneration and cloudy swelling. Few bacilli are seen within the capillaries. 4. Kidney: The epithelium of the tubules shows extreme cloudy degeneration amounting to complete necrosis in certain areas. The cells of the vessel walls and of the glomeruli do not exhibit this change to the same marked extent. Numbers of bacilli are seen both in the capillaries of the inter-tubular vessels and in the glomerular tufts. 5. Liver: This shows marked cloudy swelling. The organisms are easily demonstrated. 6. Spleen: Good preparations of this organ could not be made owing to its being diffluent. These findings corroborate the observations made at post-mortem examination, and the distribution of the organism in the lung points to the case having been one of definitely primary bronchial infection.

None of the people in the house where the patient was billeted had anything to do with hair, hides, skins, horses, or cattle. He slept on a flock mattress with a feather-bed on the top of it. The floor was covered with linoleum and there were no hair or skin rugs in the room. Stable picket-duty would involve going into the stable, but it would not be necessary for the picket to handle the horses unless the animals were restive or ill. No horse sickness was reported at Fenny Stratford nor in the neighbourhood.

In this case *B. anthracis* was recovered from the cerebro-spinal fluid and from the heart's blood and spleen, as well as from the pleural and bronchial exudates. It was clearly a general septicæmia. Beyond the abrasion over the left patella no recent sore of any kind was discovered; the shaven part of the face was carefully examined for traces of skin lesion. In the absence of any abrasion or lesion of the skin, and in view of the microscopical and histological post-mortem findings Lieutenant Tulloch came to the conclusion that the case was definitely one of primary bronchial infection. The patient's kit was removed from his billet and disinfected by the Islington sanitary authority. Examination of the articles showed that they had been sterilised and no satisfactory bacteriological examination could be made. The man's shaving-brush and razor could not be found; inquiry showed that these had been sent to the steriliser along with the other articles, but they were not returned.

As has been said, the source of infection in this case was not discovered.

CASE 3.—A Lieutenant-Colonel, aged 50, Canadian Army Medical Corps, who was in command of a military hospital near Aldershot, had not felt well for several days, the condition being regarded as ordinary catarrh or "influenza." During the morning of Jan. 3rd he seemed worse, but remained on duty until the afternoon. It was then noticed that the parotid region on the left side was swollen and a diagnosis of "mumps" was made. The swelling, however, increased very rapidly, so that by 5 P.M. the head was held over to the right. During the evening troublesome vomiting came on with acute abdominal and epigastric pain, and towards 11 P.M. the patient became drowsy. This drowsiness deepened to coma accompanied by convulsions, and with the idea that the case might be one of fulminating cerebro-spinal fever, a lumbar puncture was performed and blood-stained fluid obtained; the cerebro-spinal fluid was not under increased pressure. The patient died early in the morning of Jan. 4th.

Examination of smears of the spinal fluid revealed Gram-positive bacilli in chains and some Gram-positive cocci. This discovery raised the suspicion that the illness was due to anthrax. A post-mortem examination was made by Captain H. H. Scott, R.A.M.C., who found the following conditions.

External.—A small recently healed sore just in front of the anterior attachment of the pinna of the left ear; considerable swelling of the parotid region and of the neck adjacent to the left side, extending down as far as the clavicle. Incision into this swelling showed that the parotid gland itself was not affected, but the cellular tissue in and around it, the swelling being due to a dark bloody serum.

Dissection.—Head: The meninges congested with dark fluid. Thorax: Fluid in each pleural cavity; old adhesions at both bases. Small petechial spots over both pleuræ, mainly on, but not confined to, the lateral aspects. The lungs showed nothing abnormal beyond the general dark serous staining. Heart and large vessels: Slight atheroma at the root of the aorta, no other abnormality, no valvular mischief; myocardium dark in colour; coronary vessels patent and a little rigid. Abdomen: The interior of the stomach showed several (10–12) ecchymoses, varying in size from that of a millet seed to a shilling, and about half of them surrounded a minute ulcer. The intestines at intervals, and especially the ileum, contained similar congested, ecchymotic patches, and occasionally ulcers the size of a pin's head, about six in all. Small extravasations were also present in the mesentery in four situations. Liver: Fatty and slightly enlarged. Spleen: Large and diffluent. Pancreas: In this gland were a few minute whitish-yellow patches suggestive of fat necrosis, but not at all extensive and confined to the head. Kidneys: Right was enlarged, but showed no macroscopic abnormality. Left small and shrunken; this had been explored at an operation for perinephric abscess some years ago.

Cultures were made of the blood, of the cerebro-spinal fluid, and of the bile; and smears of the same fluids were also taken. The latter showed Gram-positive bacilli and chains of streptococci; the cultures all yielded a mixed growth of anthrax bacilli and streptococci. The anthrax bacilli were further confirmed by gelatine stabs, agar plates, and animal inoculation.

It would seem to be beyond dispute that the patient died from an acute attack of anthrax and streptococcal infection. Suspicion arose that he might have been infected by a shaving-brush. It was ascertained that the patient had purchased a new shaving-brush about three weeks before his illness. Cultures made from this brush were examined in the School of Army Sanitation at Aldershot and a guinea-pig was inoculated with the material. The *B. anthracis* was not shown to be present; the cultures contained mycoides. The guinea-pig died, but no trace of *B. anthracis* was discovered.

Two similar brushes, procured locally from the store at which the patient's shaving-brush had been purchased, were

examined by the military bacteriologists at Aldershot and at the Royal Army Medical College, Millbank, with the following results. At Aldershot the growth on agar was not typical of anthrax; broth became cloudy throughout; the gelatin stab was not characteristic, and produced gas; the bacilli were actively mobile, spores tended to be terminal, the bacilli had rounded ends, only grew in short chains, and were non-pathogenic to guinea-pigs in eight days. At the Royal Army Medical College a large number of cultures from the hair were attempted and three pure cultures of a spore-bearing bacillus which had some resemblance to *B. anthracis* were isolated and tested by intra-peritoneal inoculations of guinea-pigs. The result of this part of the examination was negative. A considerable quantity of the remaining hair was thoroughly washed in sterile saline solution and the washings were injected into a guinea-pig. The guinea-pig died within 54 to 66 hours after inoculation with typical anthrax infection.

These examinations show that it is not an easy matter to determine the presence or absence of *B. anthracis* in the hair of shaving-brushes. Additional proof that infection was in all probability derived from the shaving-brush was obtained. The brushes in question were found to have been purchased at Aldershot from a middleman, who obtained them in December, 1914, from a London firm, to whom the brushes were being supplied from a factory to which other shaving-brushes infected by anthrax had been traced by Dr. F. J. H. Coutts, of the Local Government Board.

CASE 4.—Particulars of the bacteriological examination of this case are placed at the service of the Medical Research Committee by Professor Delépine.

J. O. L., aged 49, complained of feeling ill, shivered and had pain in the head on April 23rd, 1916; on the 25th the pain in his head was severe. At 11 A.M. on the 26th he sent for Dr. T. C. Somerville, of Waterfoot, who found that the patient had slight twitching movements from time to time. No definite diagnosis was made, but cerebro-spinal fever was suspected, and Dr. J. P. Brown, medical officer of health for Bacup urban district, was asked to see the patient in the evening, and this he did about two hours before the death, which took place the same night. Swabs from the naso-pharynx and cerebro-spinal fluid were taken post mortem on April 27th and submitted to Professor Delépine, of Manchester, for examination.

Professor Delépine found no micro-organisms resembling meningococci in the naso-pharyngeal swab. The specimen of cerebro-spinal fluid sent for examination consisted of about 5 c.c. of deeply blood-stained fluid, microscopical examination of which showed numerous red blood corpuscles, leucocytes, and large bacilli, but no meningococci. On culture growths having the characters of the anthrax bacillus were obtained on April 28th; and two guinea-pigs inoculated on April 27th died on April 28th with typical anthrax lesions from which pure cultures of anthrax bacilli were recovered. The patient worked at a felt manufactory and in his employment handled East India wool and cow hair. There was some exposure to dust from the wool but practically none from the hair, and the ventilation of the room was fairly good. The man was reported as being clean in his habits, but he used no overalls, gloves, or respirator, and he took his meals in the drying-room.

In this case the cerebro-spinal fluid, which was mixed with blood, was obtained post mortem and there is no evidence to show that the *B. anthracis* was present in the cerebro-spinal fluid before death. Professor Delépine, however, points out that *B. anthracis* is always found in the cerebral and meningeal vessels in cases of general anthrax. Although the man's occupation affords a clue as to the source of infection, the channel by which the disease was acquired was not ascertained. There were no external signs to indicate that the infection might have been acquired through the skin.

CASE 5.—The particulars of this case are placed at the disposal of the Medical Research Committee by Dr. John Ritchie, bacteriologist to the county of Dumfriesshire, and Dr. Mungo Bryson, of Thornhill.

C. E., aged 16, "glass-meat" worker, was seen by Dr. Bryson on the evening of Oct. 23rd, 1916. He complained of headache, chilliness, vague pains in back and legs, and of pain and swelling on the left side of the neck. He gave a history of having driven 28 miles in an open vehicle on the evening of Oct. 21st and of having been seized by chilliness and headache on his return home. His condition became worse during the following two days, and, when seen, he was evidently seriously ill, his temperature being 103° F., his pulse 108, regular, and full. The glands on the left side of the neck were palpable, but not particularly tender. A small black scab was noticed beneath the angle of the left jaw. The patient, on being questioned, attached no importance to it, and did not know how it had been caused. The surrounding skin was perfectly healthy, showing neither inflammation, vesicles, nor any secretion. On the morning of Oct. 24th he felt rather better; temperature 101·6° F., pulse 108. The cervical glands were still painful, the throat showed no redness, and there was no skin eruption. During the night he was restless and complained of severe headache. When seen about 7.30 A.M. he was semi-conscious, but could be aroused by questioning. The pupils were equal, dilated, responded sluggishly to light, and there was slight nystagmus. Kernig's sign was present, but otherwise there was no spasm, tremor, or paralysis. Lumbar puncture was performed about 11 A.M. Approximately 10 c.c. of uniformly pink fluid, not under pressure, were drawn off. The fluid contained albumin and did not reduce Fehling's solution. About 5 ounces of urine were drawn off by catheter. It contained neither albumin nor sugar. During the course of the afternoon the patient had three convulsive fits and died about 3 P.M.

Microscopic examination of cerebro-spinal fluid.—Films made from the deposit showed great numbers of red blood corpuscles and a high leucocytosis, polymorphs and large mononuclear cells being present in a ratio of 3 to 2, roughly. The majority of those cells stained well, though a few large vacuolated cells in a degenerate condition were noted. In every field were large numbers of Gram-positive bacilli, morphologically identical with *B. anthracis*. These showed a great tendency to chain formation, chains of 15 to 20 rods being common. No other organism was detected. Cultures, aerobic and anaerobic, on blood agar and Löffler's serum showed after 18 hours a pure growth of typical anthrax colonies. Microscopically the organisms were identical with *B. anthracis*, and growth on ordinary media showed the usual anthrax characteristics save that "spiking" in gelatin stab was poorly developed.

A guinea-pig inoculated with a few drops of the washing from an 18-hours' blood-agar slope died within 30 hours. It showed the classical post-mortem appearances of experimental anthrax, and the bacilli were demonstrated in spleen, kidney, and pleural and peritoneal exudates.

A post-mortem examination of the body of C. E. was made on the evening of Oct. 26th. As it had to be rapidly performed at a late hour, and in a small country cottage, it was not practicable to make as extensive an investigation as might have been done in more favourable circumstances, but the following points were noted:—

Body well nourished. Post-mortem rigidity moderate. A small black eschar, about 0·5 cm. in diameter, beneath left jaw, showing appearances already noted. Otherwise no external evidence of disease. The left submaxillary gland seemed, on palpation, to be somewhat enlarged. Cranium: On reflecting the dura mater, which was of an intense purple colour, the pia and arachnoid were found to be exceedingly congested, all the vessels being distended and much extravasated blood filling the subarachnoid space. This hæmorrhage covered the entire cerebral surface, and was most intense over the frontal and occipital bone. At no point, however, was the shape of the convolutions obscured by the extravasation, which was evidently of a less extreme degree than that occasionally found in similar cases (Bruce and Shennan,[2] Symmers and Wilson[3]). The cerebellum, pons, and medulla were comparatively little affected. The hæmorrhagic condition appeared to be confined to the meninges, sections of the brain cortex showing nothing abnormal. Thorax: Beyond the fact that the lungs showed slight apical emphysema, and that there were some trifling pleuritic adhesions on the left side, there was nothing noteworthy in the thoracic cavity. Abdomen: The spleen was slightly enlarged, dark, and soft. The kidneys and liver showed cloudy swelling. The stomach was practically empty. It showed no sign of inflammation, nor could anything suggesting a primary focus of infection be detected in the bowel. There was no trace of peritonitis, and, except a few tubercular mesenteric glands, nothing else of note in the abdominal cavity. The left submaxillary gland showed, on section, a limited area of congestion. Cultures made from the spleen gave a mixed growth of *B. anthracis* and cocci. Cultures from the heart blood showed cocci. Sections of the brain and meninges, microscopically examined, showed extreme congestion of the meningeal vessels with much extravasation of blood. Enormous numbers of anthrax bacilli were present in the extravasation, lying chiefly around the vessels and in the subarachnoid space. Practically none were contained within the blood-vessels. There was no encephalitis. A considerable number

[2] Bruce and Shennan: Review of Neurology and Psychiatry, 1910 p. 521.

[3] Symmers and Wilson: Journal of Path. and Bact., 1909, xiii., 251.

of bacilli were found in the perivascular spaces of the cerebral substance, but here again the vessels themselves contained none. Sections of the eschar from beneath the jaw showed non-characteristic scar tissue. No anthrax bacilli could be detected. Sections of the submaxillary gland showed appearances suggestive rather of early tuberculosis than of any acute condition. No anthrax bacilli were seen.

Despite the negative results of the last-named examination, the presence of a skin lesion on the neck and the patient's complaint of pain in that neighbourhood seemed, in the absence of any other evidence as to the channel of entry of the infection, to require further investigation, although the possibility of a malignant pustule in this area aborting, healing spontaneously, and being followed later by an acute meningitis appeared somewhat remote. As the scar was within the shaving area the patient's shaving-brush was obtained for examination. The hairs were cut off, the handle broken up, the cement loosened, and the whole placed in sterile saline and slowly heated to 80° C. After cooling the liquid was strained through a loose plug of sterile glass-wool to remove solid débris, and then centrifuged. One or two loopfuls of the deposit were plated on agar, and the remainder suspended, and injected into the peritoneal cavity of a guinea-pig. The results were entirely negative.

In view of the fact that Elworthy[4] has shown that the examination of a shaving-brush suspected of having caused anthrax may give negative results, while other, unused, brushes of the same batch may show anthrax bacilli, we endeavoured to procure some other brushes from the dealer who had supplied C. E. This investigation led to nothing. C. E. had possessed his shaving-brush for a considerable time, and it was, in fact, doubtful whether he had procured it from the tradesman whose stock we investigated, or elsewhere. The only brush which resembled that used by C. E. was examined as described above, but again without result.

The fact that C. E. was employed in handling meat appeared to suggest the only other likely source of infection. The factory in which he worked deals with a large quantity of meat, much of it imported, and we could obtain no evidence of any meat of suspicious appearance having been used. No other cases of anthrax occurred among the workmen, and one would certainly have expected that, had anthrax-infected meat been accidentally used, some of the men who handled it uncooked would have been affected, rather than C. E. who worked with it only at a late stage of its preparation. Nevertheless, in the absence of any evidence of infection from other sources, the meat must rest under suspicion.

In regard to the absence of any demonstrable primary lesion the possibility of infection by the nose suggests itself. Risel[5] described a case of meningeal anthrax in which he claims to have demonstrated the passage of infection up the olfactory nerve, and points out that the direct communication which exists between the perineural lymphatics of the olfactory mucosa and the subarachnoid space gives opportunity to such a mode of spread. The infection in such a case would not necessarily be air-borne, it might be conveyed by the fingers.

The case described appears to indicate the desirability of performing lumbar puncture in all cases of meningitis of doubtful origin.—J. R.

The source of infection in this case was not traced. There is no evidence to show that the meat, handled by the patient in the course of his employment, and it was cooked meat, was infected by anthrax. Notwithstanding that careful examination of his shaving-brush failed to discover *B. anthracis*, yet as the patient had a small scar beneath the angle of the left jaw associated with pain and swelling of the left side of the neck, the possibility of infection having been acquired through the skin cannot be eliminated.

However the infection may have been acquired, the fact remains that the illness was regarded as suspicious of cerebro-spinal fever; and cerebro-spinal fluid, taken during life by lumbar puncture, was shown upon examination to contain *B. anthracis*, no other organism being detected.

[4] Elworthy: THE LANCET, 1916, i., 20.
[5] Risel: Zeit. f. Hyg. und Infectionskrankheiten, 1903, xlii., 381.

THE "LATENT PERIOD" IN ACUTE PERFORATIONS OF THE STOMACH OR DUODENUM.[1]

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ALTHOUGH a great deal has been written about acute perforation of the stomach and duodenum still the early diagnosis of the calamity is frequently missed. Not alone is an accurate diagnosis not made, but the fact that a grave intraperitoneal lesion has occurred is completely overlooked. This, I believe, is largely due to the fact that, contrary to what one would expect from reading the text-books on the subject, the symptoms in this condition are not progressive and the physical signs are not developed until comparatively late. In other words, two conditions arise—first, the perforation, and secondly, the development of peritonitis; between these two a varying interval may elapse which may well be called the "latent period." To illustrate this I cannot do better than give a short history, from many, of a couple of cases that recently occurred in my practice.

CASE 1.—A short time ago I was called to see a case, in consultation, about 50 miles from Dublin. I arrived there a couple of hours after receiving the message, on a Tuesday afternoon. The patient was a lady about 50 years of age who had enjoyed good health, unless for an occasional attack of dyspepsia, up to a couple of days previously. On the previous Sunday night she had a hearty supper at about 9 o'clock. She felt uncomfortable after this, but went to bed as usual and slept until about 4 A.M., when she awoke with violent pain in the abdomen, vomited, and felt intensely weak. Her doctor saw her at 9 o'clock on Monday morning. She then described herself as having some abdominal pain, or more discomfort than pain, but she was gradually improving and felt very much better than she had some hours previously. The patient and doctor were inclined to attribute the trouble to the supper taken the night previously, and the condition was not then regarded as very serious. All day on Monday her condition remained pretty much the same. On Monday night she got a ½ grain of morphia hypodermically to produce sleep; this had the desired effect. On Tuesday morning, when the doctor again saw his patient, he got an unpleasant surprise. She looked badly, had a quick weak pulse, and her abdomen was markedly distended. He at once recognised that acute peritonitis was rapidly developing, and sent for me with a view of having operation carried out.

When I saw the patient early in the afternoon she was dying. All the symptoms and signs of diffuse peritonitis were then present. She lay on the back motionless, with the legs well drawn up; her breathing was altogether thoracic in character; her general aspect could not be worse. Her pulse was almost imperceptible and could not be counted, and her temperature was subnormal. She did not complain of pain and her mind was perfectly clear. Her abdomen was distended to almost bursting-point; she begged for something to be done for her. While I was discussing with her doctor the futility of operating the patient died.

Both of us were quite agreed that the cause of the fatality was gastric or duodenal perforation, probably the latter on account of the comparative absence of symptoms previous to the attack. The early diagnosis of the condition was entirely missed by as able a practitioner as there is in the provinces. He was completely misled by the condition of the patient when he first saw her, by her persistent statement that she was rapidly improving, by the complete absence of well-marked physical signs, and by the fact that she remained thus during the whole of his first 12 hours' attendance.

The second case occurred within a week afterwards, but fortunately had a very different ending.

CASE 2.—Miss ——, aged 22 years, was admitted to St. Vincent's Hospital on a Sunday afternoon about 5 o'clock. She was examined by the house surgeon, Dr. A. Courtney, who promptly diagnosed gastric perforation and sent for me, while at the same time he made preparations to have an operation carried out. Being Sunday I had some distance to get back to Dublin after receiving the message, but I saw her at 8 P.M. and got the following history. The patient had suffered from repeated stomach

[1] A paper read at the Surgical Section of the Royal Academy of Medicine in Ireland.

trouble for some years and had received a good deal of medical treatment for the condition. She retired to bed on Saturday night in her usual health, but awoke on Sunday morning about 5 o'clock with violent abdominal pain. She vomited once and then almost fainted. After a couple of hours her symptoms practically passed off and she did not send for a doctor until 4 o'clock in the afternoon. She drank fluids pretty freely during the day. The doctor sent her unlabelled to St. Vincent's Hospital. On examination, about 16 hours after the attack beginning, her appearance was by no means bad; she did not complain of much pain, but felt decidedly uncomfortable. Superficially one would not think that she suffered from any grave abdominal lesion. She lay rather naturally with her legs fully extended; her breathing was by no means distressed and was not wholly thoracic; her pulse-rate was, however, suggestive, being from 110 to 120; her temperature was normal. Her abdomen was somewhat distended, and although tenderness was present, it was by no means well marked, and was principally above the umbilicus. There was almost a complete absence of rigidity of the abdominal muscles. Although one might miss the diagnosis, I had no hesitation in confirming Dr. Courtney's opinion.

Operation.—On opening the abdomen by incision to the right of the mid-line I found a large quantity of a greyish-green fluid everywhere present in the peritoneal cavity. I did not notice any free gas present. The visceral peritoneum was everywhere injected, I saw no pus and no sign of lymph formation anywhere; the intestines were generally distended but not to a great extent. After some time I located a perforation, into which I could put the tip of the index finger, at the extreme cardiac end of the stomach. To reach the perforation I had to prolong the incision right up to the ensiform cartilage. To close the perforation in this situation was by no means easy. By getting Dr. Courtney, who was assisting, to pull the liver upwards with one hand, while with the other he drew the stomach downwards, I was enabled to bring the site of the perforation better into view. I attempted to pass through-and-through sutures for closure, but they at once cut their way out. This was due to the large area of ulcerated and inflamed tissue surrounding the perforation. Consequently I had to close the perforation by sero-muscular sutures. These were interrupted in character and extended from well above the perforation to well below it. They were outside the ulcerated area, and by their insertion the ulcer was completely inverted and large surfaces of peritoneum were brought into apposition. I inserted only one row of these and no other means of closure was adopted. The cardiac end of the stomach was considerably narrowed in lumen when the sutures were tied, but no ill-effects seemed to follow. I removed the contents of the stomach that had escaped into the peritoneal cavity by gently swabbing with dry sponges. I used no douche, as is my invariable practice in all cases of peritoneal infection. Closure of the wound and providing for free drainage completed the operation. I placed a drainage-tube with gauze wick (1) between the liver and the diaphragm; (2) above the pubes; (3) one in each flank. These latter three I inserted by stab incisions, easily made when the abdominal wall is made to project from the inside on the finger or a forceps. During the operation and subsequently before she regained consciousness the patient received about 8 pints of normal saline solution administered under the breasts. The recovery was rapid and uneventful. No pus formation occurred after the operation.

The absence of pus or of purulent peritonitis either at the operation or subsequently is probably due to two or three causes. 1. The stomach was empty of food when the perforation occurred, consequently its contents were not highly septic. 2. The fact that the perforation occurred high up. I think we may take it as pretty certain that the more we descend in the gastro-intestinal canal the more septic the contents become. 3. The free drainage provided for at the operation. I am indebted to Dr. Courtney in this case for his prompt diagnosis, his able assistance at operation, and his after-care of the patient. I would emphasise the fact that when I saw her first, 16 hours after the perforation occurring, the symptoms were not severe and the signs of diffuse peritonitis were not at all very pronounced.

In both of these cases perforation occurred when the patient was asleep and when the stomach must have been free from food. This would point to the conclusion that auto-digestion plays a great part in the occurrence. To look at these cases of perforation from a proper standpoint we must remember that an interval varying in length elapses between the two acts of the tragedy—first the perforation, then peritonitis; and that for treatment to be successful our interference must take place before the second act is staged, or, at all events, before it is long in existence. Consequently early diagnosis is essential.

To simplify early diagnosis I consider it convenient to divide the course of events as regards symptoms and signs into three stages: (1) The stage of shock and collapse, (2) the stage of reaction, (3) the stage of diffuse peritonitis. One need only remember the sequence of events to see why each of these set of symptoms is brought about. The shock as well as the pain is altogether due to the injury which the peritoneum receives from contact with the stomach or intestinal contents. When the stomach is emptied, as it pretty quickly will be, by extravasation of its contents and by vomiting, the injury to the peritoneum ceases, until septic conditions develop. Unless the patient has received a knock-out blow reaction sets in, and the patient may be comparatively well sometimes for several hours. The length of time will depend on the degree of septicity of the contents escaped into the peritoneal cavity and on the amount. The development of peritonitis requires no explanation.

It is frequently during this time of reaction or latent period that the medical attendant first sees the patient after the attack has begun. Consequently his difficulty of diagnosis. He finds little on examination; the patient may look well, and usually asserts that improvement in his or her condition is decided. Symptoms are more or less in abeyance and physical signs are not yet well marked, and if the practitioner's knowledge of acute perforations has been derived from books and not from experience there is risk that the diagnosis will be missed. How, then, is the diagnosis to be made? The history of the case previous to the attack is of some value; the history of the attack itself is absolutely essential.

An acute attack of violent abdominal pain associated with severe shock and collapse, and followed by an improvement in the mind of the patient, is always significant. Add to this an increasing pulse-rate with a subnormal temperature and there is quite sufficient to warrant operative interference. Vomiting is not of much significance, as it may be absent in perforations, and it is present in so many other conditions.

Of course there will be physical signs elicited on a careful abdominal examination, but not so pronounced, as is usually believed, previous to the development of peritonitis. Great stress is laid on the rigidity of the abdominal wall. True, there will be rigidity present, but at this stage of the trouble it will be strictly confined to the area of the abdomen involved, and I have never seen it so marked that it could be described, as it often is described, as being "board-like" in character. Tenderness will also be confined to the region of the perforation, and no decomposition will have occurred either in the peritoneal cavity or in the abdomen to produce marked distension. So that during the "latent period" the diagnosis will have to be made (1) from the history of the attack; (2) an increasing pulse-rate without corresponding increase in temperature; (3) localised rigidity of the abdominal muscles; (4) localised abdominal tenderness; (5) beginning abdominal distension.

Fortunately, when the diagnosis is made there is no difference of opinion as to the essentials of treatment. These are altogether operative, with two main objects in view: to repair the lesion and to get rid of the foreign material from the peritoneal cavity. I always get rid of this material by dry sponging, gently used. I never douche, as I believe it does more harm than good, especially by bringing the infective material to the most remote corners of the abdominal cavity. Besides it takes time. I usually employ drainage, always when the soiling of peritoneum has been present for a few hours.

There is one other point about which a legitimate difference of opinion exists in the minds of surgeons. Should gastro-enterostomy be performed at the same time if there is indication that this procedure will be required later? Personally I am decidedly of opinion no, if it can be at all postponed. The further time required may turn the scale completely against the patient; besides, we are working in an infected area, and this is not conducive to good results. But in the last few weeks I had a patient from Mr. T. M. McEvoy, of Blackrock, with stomach perforation, in which I had to perform gastro-gastrostomy, and with the happiest results.

* This patient had a perforation in the centre of a large ulcer on the anterior wall of the stomach about the junction of the upper and middle thirds. When I had the ulcer inverted the stomach was divided into chambers with only

Continued at foot of next page.

MECHANICAL SUPPORTS IN PLASTIC SURGERY.

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THE problem of the restoration of the contour of the face resolves itself into the provision not only of the fleshy covering, but also of the supporting substructure. It is the supporting framework with which we wish to deal in this paper, and we think its importance so great that too much consideration cannot be given to this subject by the plastic surgeon. In no other part of the work does the coöperation of the dentist and surgeon come more fully into play. Failure to provide a suitable substructure is, in our opinion, the commonest cause of plastic failures.

We hope very much by the illustration of certain types of case to prove the value of combined work. Exigencies of space prevent more than two cases being illustrated out of each group.

Firstly, we would discuss cases in which apparatus has been fixed in the mouth before operation, and we have divided these cases into three classes: Class 1, where the loss of substructure is slight and only requires a modified splint denture. Class 2, cases in which large prostheses were required to replace extensive loss of bone in the superior maxilla. Class 3, cases in which large prostheses were required to replace extensive loss of bone in the mandible.

Secondly, two cases are here illustrated to represent the class in which failures have occurred owing to the absence of correct substructure.

Before going on to the illustration of our point by these chosen cases we wish to make a few general remarks on post-operative treatment, when the support is implanted in the mouth at the time of operation. These remarks will be confined to the maintenance of cleanliness and to the importance of keeping the prosthesis continuously in its position. We are very strongly of opinion that every effort should be made before operation to fix in the requisite appliance; that in any cases in which this is impossible owing to cicatricial bands, as much of the apparatus as possible should be prepared beforehand, and the rest fitted during the somewhat lengthy operation; that when fitted, and the fleshy covering has been brought into place, no attempt should be made to remove the prosthesis until the tenth day, by which time the flap should be firmly united. Cleanliness is maintained by the usual oral hygiene, and in lower-jaw cases, in order to avoid any cul-de-sac, external drainage is usually provided. We also practise very slight loosening of the apparatus in order that syringing may be more efficiently carried out. As before stated, however, no effort is made to remove the appliances from the mouth, and we have come to this conclusion for the following reasons. It is frequently impossible to remove a large prosthesis; the removal causes pain to the patient, the apparatus seldom replaces itself into exactly the same bed, and it is never so comfortable after replacement. Moreover, the continual taking out and putting in of the mechanical support very considerably disturbs the commencing union of the flaps, allowing septic material from the mouth to invade the tissues. We are thus following the cardinal principle of keeping the parts at rest, and we think we have shown that the cleanliness of the mouth is not hereby jeopardised.

Of the cases in which successful prosthesis has been applied at the time of operation,

Class 1 consists of modified splint dentures. The greatest care is taken by Captain King and his staff to see that the apparatus is made to fit as firmly as possible, and that no roughness will be exposed to the tissues. Artificial teeth are usually added, which give not only confidence to the patient, but also guidance to the surgeon. Two cases (Figs. 1–5 and Figs. 6 and 7) illustrate this class, but do not require any special description of dental apparatus.

Class 2.—Cases in which large prostheses are required to replace large loss of bone in the superior maxilla.

Private G. (Figs. 8–10).—This case is characterised by large loss of the superior maxilla, together with almost complete loss of the upper lip. There remained only a small tag of mucous membrane near the left angle of the mouth. The prosthesis was made to represent the lost bone, and the skin and mucous flaps formed over it. Result of first operation shown.

Private A. (Figs. 11–14).—This case showed not only extensive loss in the upper jaw but also fracture of the lower. The edentulous condition made the work of the dental surgeon particularly difficult, and the favourable result of the first operation, as shown in Fig. 12, was only made possible by the three months' dental work, which consisted of (1) a palate plate which replaced the tissues of the palate; (2) a splint retaining the three fractured parts of the mandible in correct position; and (3) a vulcanite flange to support the lips and cheeks during and after operation.

Class 3.—Lower-jaw cases with large loss of bone requiring large prostheses.

Private G. (Figs. 15–17).—This man was edentulous, and had suffered a large loss of bone as well as lip. A lower denture was fitted, replacing the lost parts, and the plastic operation performed over it. The figures illustrate the condition on arrival and after one operation.

Private O. (Figs. 18 and 19).—This case shows the result of a plastic operation rendered simple by the preliminary dental treatment, which consisted in the fitting of upper and lower vulcanite splints, and the support externally of the chin by a vulcanite splint supported to the head with elastic. The patient was edentulous.

The other side of our argument is well illustrated by the unfavourable results obtained in the following cases, where, for various reasons, some unavoidable, no suitable apparatus was continually kept in position after the operation.

Sergeant E. (Figs. 20–23).—Operation performed for the formation of the new upper lip. The prosthesis made was not retained in position, and the inferior result is shown in the figures, necessitating the division of buccal adhesions and the stretching of the lip. A subsequent plastic operation has been done.

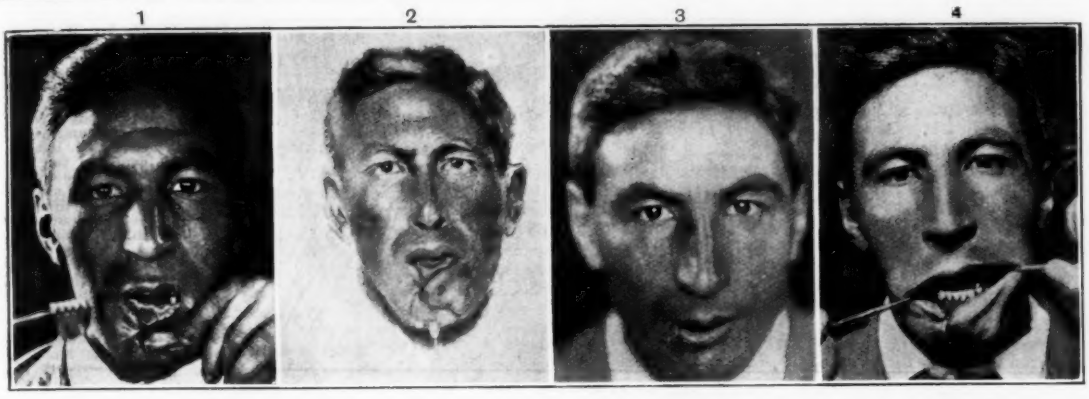
Sergeant H. (Figs. 24–27).—This case was characterised by very large loss of mandible, in the region of the angle, combined with buccal fistula. The dental treatment consisted in maintaining occlusion of the remaining teeth by a fixed biting flange enabling him to masticate. This flange (Figs. 25 and 27) was constructed by Captain F. E. Sprawson, R.A.M.C. An operation for the closing of the buccal fistula resulted in primary union, but owing to the very large loss of mandible, there is an unsightly depression which would not have occurred if it had been possible to insert any apparatus to take the place of the large bone loss. The loss of function in this case is so slight owing to the excellent articulation of the remaining teeth that a contemplated bone graft has been abandoned. Patient can eat his ordinary home diet.

Continued from preceding page.

a small opening between. I exposed the posterior wall in the usual manner through a rent in the transverse mesocolon. I did an anastomosis by suture between the upper and lower pouches. The patient made a complete and rapid recovery and was apparently free from all stomach trouble when leaving the hospital three weeks after operation.

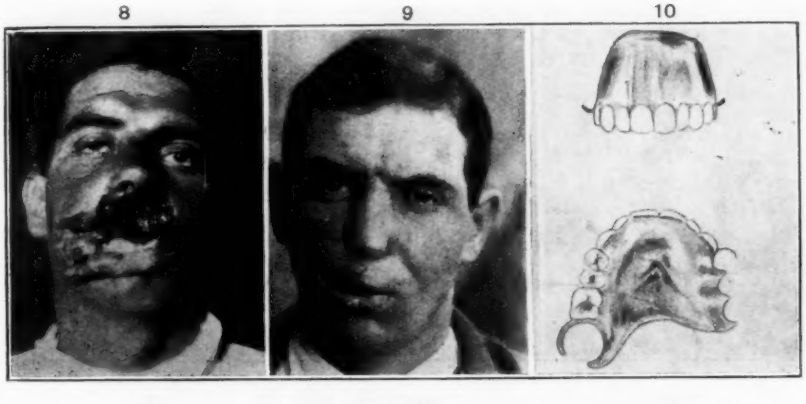
I owe an apology for bringing up for discussion a subject about which so much has been written, but I hope to have done something to direct attention to the early and accurate diagnosis of a condition which, when not detected promptly, is nearly invariably fatal.

Dublin.



FIGS. 1 to 5.—Wounded 1/7/16. The deformity is well illustrated in Fig. 2, from a drawing by Prof. Tonks, F.R.C.S. Plastic operation 17/8/16. The radiating scars were all excised and by utilising the healthy skin in between scars it was not necessary to make any special flaps. The result is shown in Fig. 3.

FIGS. 6 and 7.—Wounded 1/7/16; operation, 16/8/16. Loss of bone through *whole* thickness of mandible. Operation: Performed over a modified splint denture, which retained the jaw in position. A successful osteoperiosteal bone graft from the tibia has since been performed.



FIGS. 8, 9, 10.—Wounded 14/8/16; operation, 5/10/16. The main principles in this operation were thick lateral-nasal flaps from the cheek combined with mucous membrane flaps from inside. The result of the first operation is shown. Further improvement in the mouth and nose have since been made.

FIGS. 11 to 14.—Wounded 1/7/16. Characterised by partial loss of superior and inferior maxillæ, cheek, upper lip and corner of mouth. Result of the first operation on 4/10/16 is shown in Fig. 13; his condition immediately preceding is shown in Fig. 12. Fig. 13 result was obtained by cutting two flaps, one from the cheek and one from below the chin. Subsequent operation has markedly improved the left corner of the mouth.

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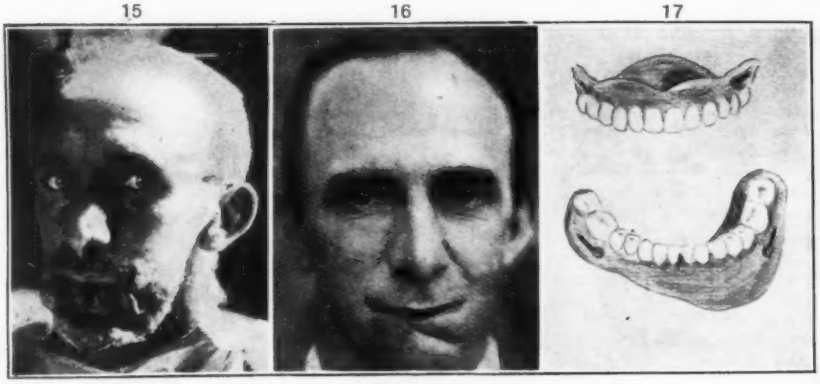

FIGS. 15, 16, 17.—Wounded by shell 7/1/16. Condition: loss of two-thirds of the lip; extensive loss of mandible left horizontal ramus, with loss of alveolar border in region of symphysis and fracture of R. ramus; edentulous. Operation, 18/9/16. A thick flap from the left cheek with its base downwards was cut and swung down to form the missing part of the lip and angle of the mouth. To this was attached a mucous membrane flap, dissected up and slid forward from the inside of the left cheek; and also united to the existing membrane of the lip and supported by the plate shown in Fig. 17.

18 19

FIGS. 18 and 19.—Wounded 1/7/16. Comminuted fracture of body of mandible with loss of bone; edentulous. The bone fragments were carefully supported with internal and external splints, and when the extrusion of sequestra had ceased the scars were carefully and completely excised and the form of the chin and lip restored. The lip remained in a swollen and distorted condition until the operation (10/10/16).

FIGS. 20 to 23.—Wounded 14/2/16; admitted 15/4/16; operation, 21/6/16. —This series is meant to illustrate the bad effect of non-retention of apparatus following operation. The lip appeared to be satisfactory, but owing to an attack of bronchitis the support (Fig. 21) was removed and the lip gradually fell in (Fig. 23). The nasal deformity was automatically rectified by utilising the flesh buried in the left nostril to form part of his new lip. The lip had to be stretched (Fig. 22). Two further operations have got over these difficulties with satisfactory result, but these two operations might conceivably have been unnecessary.

FIGS. 24 to 27.—Wounded 13/7/16; operation, 26/8/16. The functional result of this case, obtained by maintaining the bite, and the operation for the closure of the buccal fistula were very satisfactory. But the case is shown to illustrate the deformity following the loss of the angle of the jaw, which deformity is not to be overcome by any intra-oral prosthesis in common use. Cosmetically a successful fat graft is indicated—functionally nothing further.

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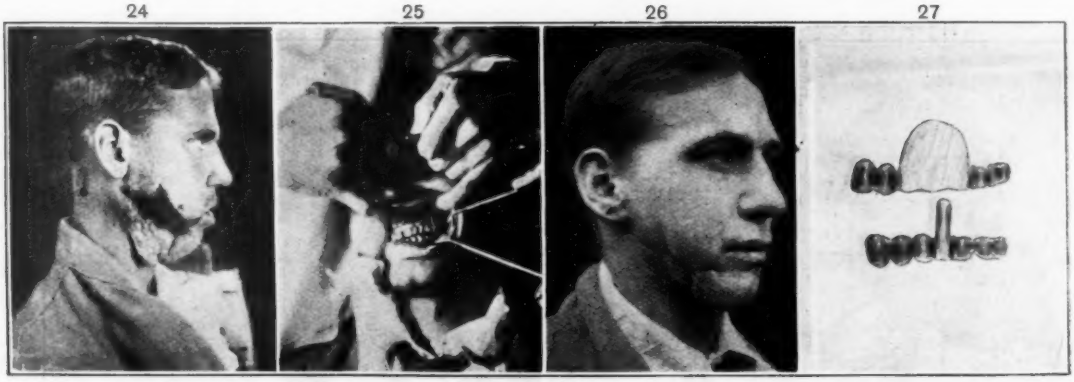

PLASTIC REPAIR IN WAR INJURIES TO THE JAW AND FACE.

BY PERCIVAL P. COLE, M.B. BIRM., F.R.C.S. ENG.,

HONORARY SURGEON, KING GEORGE HOSPITAL, LONDON; OPERATING SURGEON, BROOK WAR HOSPITAL; ASSISTANT SURGEON, SEAMEN'S HOSPITAL, GREENWICH, ETC.

THE cases naturally group themselves into two classes, according to the nature of the deformity produced. In the one class the deformity is due to laceration with little or no loss of soft tissues; in the other, and more important, category definite destruction of soft parts gives rise to deformity which varies directly with the loss sustained. In both classes there may be an associated injury to or loss of bone, a complicating factor which has an important bearing on the mode of treatment to be adopted.

In all cases functional must take precedence of cosmetic considerations. Bony lesions must first be dealt with in such a way as to make possible the restoration of normal function. It may be laid down as an axiom that the repair of damaged or destroyed soft parts should never be undertaken until fractured fragments have been efficiently splinted. It may be thought unnecessary to lay stress upon such an apparently self-evident essential. Many cases, however, have come under my care in which such repair has been carried out, and that before a permanent splint had been adapted. In these cases it has been necessary to undo all that has been done to enable an efficient appliance to be inserted. Broadly speaking, early suture in cases associated with bony lesions is not to be recommended. In uncomplicated laceration, with little or no loss of tissue and not involving the mucous membrane of the cheek, early suture has a definite claim to consideration. Time will be saved and the formation of scar tissue to a large extent obviated. Where extensive laceration is associated with definite loss of tissue it is obvious that a depressed scar will result unless the lost tissue can be replaced. The best means of dealing with such a condition is the insertion of an autoplastic graft, a measure that will not be attended with success until every source of sepsis has been eliminated—that is, until the wound is soundly healed. The illustrations show the condition of such a wound on admission (Fig. 1) and after operation (Fig. 2). The most ugly scars can thus be treated with the certainty that a satisfactory cosmetic result will be achieved.

It is, however, in the repair of lesions associated with loss of substance involving the mucous membrane either of the lips, cheek, or nose that the surgeon is afforded the greatest scope for the exercise of judgment and ingenuity. The one object always to be borne in mind is that any procedure must be so planned as to assure that the functional activity of the jaws shall be in no wise diminished. The paramount importance of this consideration and the greater ease and certainty of its attainment when the operation is undertaken at a later stage is the chief argument for adopting a waiting policy. Ingenious apparatus for the stretching of scar tissue has been devised, figured, and described by dental surgeons both in this country and abroad. The only objection to their use is that in a properly conducted case they are totally unnecessary; it is obviously a sounder policy to prevent cicatricial contraction, or to plan operations in such a way that due allowance is made for such contraction

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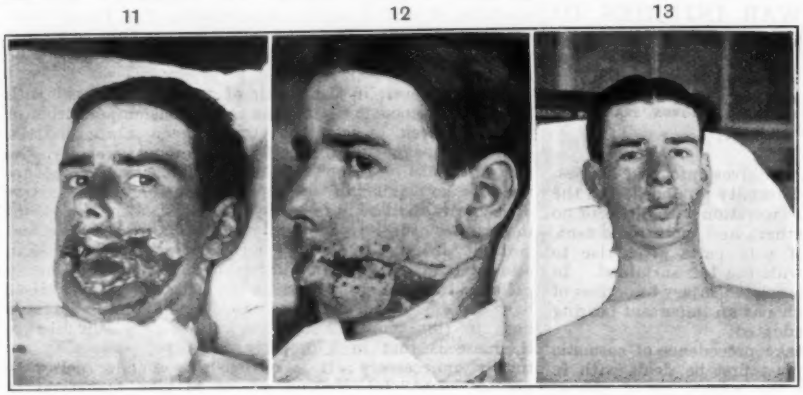

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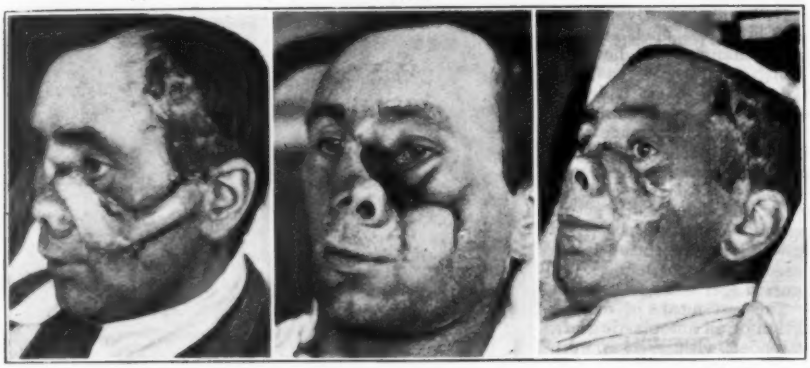

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as must take place, than complacently to allow crippling contractions to occur and endeavour to redeem the situation by laborious methods designed to stretch and expand them. It is in this policy of prevention that my colleague, Mr. C. H. Bubb, has rendered me such invaluable service. The preservation of the buccal sulcus should be the constant aim of surgeon and dental surgeon alike, and both can contribute to its attainment. The importance of this cannot be too strongly emphasised. Failure in this respect renders the adaptation of a denture or prosthetic appliance very difficult, and frequently impossible, with the result that the implicated side of the jaw is rendered totally functionless. The cosmetic result in such a case may be entirely satisfactory; a fair exterior may decorously mask a functional failure.

In some cases associated with extensive bony lesions the loss of soft parts is more apparent than real. The skin edges curl over and invert to a degree sufficient to permit firm adhesion to the margins of the bony gap. This applies particularly to injuries of the upper jaw and the overlying tissues. Much can be done in such a case by freely stripping the tissues from the bone, followed by careful and separate readjustment of mucous membrane and skin surface. Figs. 3 and 4 illustrate the appearance of a case of this type before operation. The patient had been wounded three months previously. A suitable splint was inserted and retained until the parts were soundly healed. Fig. 5 shows the appearance after the sixth operation; the splint is in position. The associated bony lesions were destruction

20 21 22 23

of the greater part of the left maxilla, including the corresponding portion of hard palate, together with entire loss of the left ascending ramus, which was removed as a sequestrum. On admission to my wards at the King George Hospital cicatricial contraction had taken place to such an extent that the patient was unable to open his mouth more than one-sixteenth of an inch. A prosthetic appliance has been constructed and inserted by Mr. Bubb to such good purpose that the patient's functional capacity has been completely restored. In Fig. 6 is shown the final result. The nose is artificial; it was made and modelled by Mr. Brooks.

In most severe cases the tissues have suffered such a degree of destruction that mere readjustment will not suffice to ensure a satisfactory result. Some form of flap must be utilised to make good the loss sustained. The various types of flap may be classified as follows:—

I. *Single flaps.*—1. Sliding. 2. Transposed, the type commonly used to remedy ectropion. These two forms can only be used when the tissues in the immediate neighbourhood of the gap are sufficiently lax to admit of direct borrowing. 3. Transferred, depending temporarily for blood supply on a pedicle situated at a distance. 4. Hinged. A flap rotated on a hinged pedicle formed at the margin of the gap.

II. *Doubly epithelialised flaps.*—1. Formed in the gap coincident with its closure by the interposition of a single flap with the immediate or later imposition thereon of a second single flap. 2. Formed at a distance, formation antedating closure, (*a*) with one primary pedicle, (*b*) with two primary pedicles.

The use of single flaps is practically confined to reparative work on the lips. For this purpose the sliding and transposed flaps only can be utilised. The mucous membrane on the deep surface is included in the flap.

Plastic repair of lower lip and chin is illustrated by Fig. 7 (before operation) and Fig. 8 (after operation). There was an associated fracture at the symphysis with considerable loss of bone. The operation was performed with a suitable splint *in situ*. Another example is illustrated in Figs. 9 and 10. The bony lesion in this patient was similar in nature. The functional capacity of both these patients has been completely restored.

The type of case suitable for the employment of a double flap formed in the gap and coincident with its closure is shown in Fig. 11. In Fig. 12 the flaps are shown in position immediately after operation. The under flap is pedicled and its raw out-turned surface is uncovered at its posterior part. The superimposed flap is of the sliding variety. Fig. 13 exhibits the pedicle cut, the spare skin being used to relieve tension in the neck. The associated bony lesion was a badly comminuted fracture of the lower jaw on the left side. Firm bony union had occurred before the operation was undertaken.

The combination of hinged and pedicled flap is shown in Fig. 14. In Fig. 15 the condition before operation may be seen, the skin margins being everywhere turned in and adherent to bone. The under flap is formed from the skin of the face and rotated, with its skin surface towards the nasal cavity, on a hinge formed at the lower part of the gap. This flap is entirely covered, as is the raw surface left by its formation, by the superimposed pedicled flap taken from the scalp. This flap was 7 inches long and its pedicle is shown before severance. The union has given way over a small area at the upper margin of the gap. In Fig. 16 the pedicle has been cut and the redundant portion of the flap replaced to make good the deficiency in the scalp.

Some gaps are more conveniently closed by means of double epithelialised flaps formed at a distance. Such a case is seen in Fig. 17. The tongue is protruding on the lateral aspect of the neck. The lower margin of the gap is dotted with displaced necrotic fragments of bone. Fig. 18 shows the condition attained before closure was attempted. Fixation of the bony fragments by a suitable splint has determined contraction of the tissues towards the fixed points, and new bone has spread along the whole length of the gap. The condition after closure of the defect and severance of the pedicle is illustrated in Fig. 19. The flap that was used in this case was fashioned with a single primary pedicle. The scar in the neck indicates the original site of the flap. Muscular control of the lips has been perfectly restored and complete restoration of mastication is assured.

Where, on account of the size of the defect, large flaps must necessarily be employed, it will be found advantageous to utilise two primary pedicles. The type of case for which such a procedure is indicated is shown in Fig. 20. The soft tissues have been completely destroyed over the area illustrated, exposing an irregular bony bed made up for the most part of malar bone and posterior wall of the antrum. This patient, when transferred to my wards, had absolute trismus owing to cicatricial contraction. This was efficiently rectified and a splint inserted (Fig. 21). A double flap was fashioned having one pedicle at the upper part of the chest wall and another in the neck. These were stitched together, raw surface to raw surface. At a later date the chest pedicle was cut. Fig. 22 shows the flap swung into position, with the neck pedicle intact. The skin surface derived from the anterior chest wall forms the inner surface of the false cheek. In Fig. 23 the pedicle has been divided and the right angle of the mouth reconstituted. This patient was to have been sent away to be provided with a face mask. Other operations have been and remain to be performed before the case is finished. Even if, at the stage depicted, artifice had been invoked as a cosmetic aid, plastic surgery would have conferred upon this patient the inestimable advantage that his functional capacity, both as regards control of saliva and masticating power, had, by the use of his own tissues, been fully restored. It is certain that the resources of plastic surgery are adequate to deal effectively with numbers of cases for which various types of artificial apparatus are employed. Surgery alone can reconstitute; artifice must substitute. In some cases, undoubtedly, the best possible results will only be achieved by drawing on the resources of both.

The anæsthetics were most skilfully administered by Dr. Francis E. Shipway and Mr. Ramsey Phillips. Intratracheal ether has been the routine method adopted, not only for the type of case herein described, but also for such procedures as the taking of impressions, insertion of splints, and operative measures for the immediate reduction of deformity in old and recent fractures of the jaw.

The benefits that accrue from the use of this method cannot well be exaggerated. For the surgeon operating is rendered easy and comfortable in that all his energies, untrammelled by extraneous considerations, can be devoted to the immediate task in hand; the mouth is, as it were, a limb. For the patient nausea, vomiting, and post-anæsthetic complications are eliminated.

The marked tendency to keloid in some of the patients has led to the trial of methods for the alleviation of this disfiguring condition. Passive hyperæmia and ionisation have been employed without avail. The most successful results have been obtained by the use of X rays and radium. Dr. Robert Knox has very kindly carried out treatment by these agents in the electro-therapeutical department of the Cancer Hospital. His results clearly indicate that the most disfiguring scar can be effectively dealt with by these methods. The photographs were taken by Dr. A. Norman, to whom my best thanks are due for the time and labour devoted to their preparation. These have been, in most cases, taken very soon after operation. Considerable improvement in appearance invariably occurs after a few months and may be aided by growing a moustache or beard. In every case function has been completely restored or its restoration has been definitely assured. The care of these cases demands from the nursing staff the exercise of the greatest patience, and entails constant and scrupulous attention to detail. It is a great pleasure to acknowledge the whole-hearted enthusiasm with which they and my resident, Mr. T. H. Lunney, have devoted themselves to the work.

It may be stated, in conclusion, that the type of case herein discussed comprises one variety only of the cases admitted to my wards at the King George Hospital. They all have this in common, in that the plan of treatment for each individual is determined by conjoint consideration, conjoint aim, and conjoint action on the part of my dental colleague Mr. Bubb and myself.

Harley-street, W.

THE LATE BENJAMIN POWER BEAMES BURROUGHS, M.R.C.S., L.S.A.—Mr. Burroughs died on Feb. 16th, at his residence at Weston-super-Mare, in his seventy-first year. He was a son of the late Mr. R. C. Burroughs, barrister-at-law, and had practised in Weston for over 40 years, where he was much respected. He was for several years on the honorary staff of the Royal West of England Sanatorium.

THE ANTIBODY CONTENT OF THE CEREBRO-SPINAL FLUID IN MENINGOCOCCAL INFECTIONS,

WITH SPECIAL REFERENCE TO VACCINE TREATMENT.

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(A Report to the Medical Research Committee.)

THE vaccine treatment of many infective conditions, more especially of chronic infections, has now become a widely practised therapeutic procedure. It is a firmly established and well-known fact that a vaccine on injection into the tissues acts like all antigens do in stimulating the production of specific antibodies in the body tissues and fluids of the injected individual. Not only can the presence of these specific antibodies—whether bacteriolytic, agglutinating, complement-fixing, or opsonic—be readily recognised in the blood serum, but by the exercise of the appropriate technique their amounts can be determined with great accuracy. Certain of these methods, indeed, have now become the commonplace procedures of the clinical laboratory, being in daily use for the detection and differential diagnosis of many infective diseases.

There is also some evidence to show that these specific antibodies are not confined to the blood, but may also be found in the other body fluids, more particularly the lymph. An exhaustive investigation into their presence and abundance in various other body fluids, such as the cerebro-spinal fluid, the aqueous humour, the lacrymal fluid, ascitic, pleural, and pericardial fluids, and in various transudates and exudates, would probably throw much light on the exact seat of origin of these bodies.

The question of the presence or absence of these antibodies in the cerebro-spinal fluid becomes an important one in the consideration of the vaccine treatment—prophylactic or curative—of meningococcal cerebro-spinal meningitis, for unless the antibodies reach the interior of the thecal sac, and so be present in the cerebro-spinal fluid, the indications for the exhibition of the vaccine injected subcutaneously would be lacking.

Vaccines have already been administered in this condition, either alone or as an adjunct to other methods of treatment, but according to the official report of the Medical Research Committee on Cerebro-spinal Meningitis no very satisfactory clinical results have been recorded, and so no very definite indications or contra-indications for or against their use can be obtained on clinical grounds alone.

The opportunity of investigating this question experimentally was presented to me whilst working in the London District Cerebro-spinal Fever Laboratory at the Royal Army Medical College at Millbank last year in association with Captain Arthur Davies, R.A.M.C., who suggested this investigation to me, while Lieutenant-Colonel Mervyn Gordon, R.A.M.C., kindly supplied the materials employed.

Young rabbits of 1000 to 1500 grammes weight were inoculated with gradually increasing doses of meningococcus cultures until the blood serum showed a high grade of agglutination towards the strain of the organism injected, several different strains of the meningococcus being employed in the various experiments. The animals were then bled, the serum being employed by Lieutenant-Colonel Gordon[1] in the agglutination and absorption experiments, which proved that four chief strains or types of meningococcus were responsible for the cases of cerebro-spinal fever met with in this country.

The animals, along with a little of their sera and a culture of the infecting organisms, were then handed over to me. The cerebro-spinal fluid was obtained by puncture of the spinal theca through the occipito-atlantoid ligament, where spinal puncture is most easily performed in the rabbit. In some cases blood-stained fluid was obtained. This was at once rejected and only cerebro-spinal fluid free from any trace of blood was employed.

The agglutination titre of the blood and of the cerebro-spinal fluid was then ascertained, the macroscopic method of agglutination being employed. A suspension of a 24-hour culture of the injected coccus in normal saline solution heated to 65° C. for 30 minutes was employed, the heating being employed not only to kill the micro-organisms but also to inactivate the autolysin, for it has been shown by Raymond Koch that such a heated suspension of meningococci keeps well and gives reliable results for many months. The results were read off after 24 to 48 hours as recommended by Kutscher. The results obtained are set forth in the following table:—

Table Showing Agglutination Titre of Serum and Absence of Agglutinins in Cerebro-spinal Fluid of Rabbits Injected with Various Types of Meningococcus.

Expt.	Type of meningococcus injected.	Agglutination titre of serum.	Agglutination titre of cerebro-spinal fluid.
1.	Carter, Type I.	1 in 320.	Nil.
2.	Chase, Type III.	1 in 320.	,,
3.	Shore, Type III.	1 in 256.	,,
4.	McPhail, Type II.	1 in 256.	,,
5.	Uninoculated control.	Nil.	,,

The results obtained in these experiments show that although the serum of the injected animals exhibited a fairly high agglutination titre against the homologous types of meningococcus, the cerebro-spinal fluid in all cases showed no trace of agglutinating properties.

Hitherto very few investigations have been carried out on the antibody content of the cerebro-spinal fluid and these chiefly with *B. typhosus*.

Thus Rosenberg[2] studied the concentration of typhoid agglutinins in the body fluids of rabbits immunised against the typhoid bacillus. He found that the concentration of the agglutinins depends on their concentration in the blood, and that ascitic fluid and pleuritic and pericardial fluids contain a greater percentage of agglutinins than do cerebro-spinal fluid, aqueous humour, and urine.

Braude and Carlson[3] have shown that the serum, thoracic lymph, neck lymph, and pericardial fluid of normal dogs contain agglutinins for the typhoid bacillus, being most abundant in the serum, whilst the cerebro-spinal fluid and the aqueous humour possess no agglutinating properties. In dogs immunised against typhoid bacilli, however, they found that agglutinins were present even in considerable quantity both in the cerebro-spinal fluid and the aqueous humour.

Hughes and Carlson[4] investigated the hæmolytic power of the body fluids of normal dogs and found that although the serum of the dog is hæmolytic to rabbits' erythrocytes, no laking of rabbits' corpuscles was produced by the cerebro-spinal fluid of any of the 15 dogs investigated.

Working with human body fluids Pick[5] and Levy and Geissler[6] have described the presence of bacterio-agglutinins in the cerebro-spinal fluid and aqueous humour, pericardial fluid, and various exudates and transudates in patients suffering from typhoid infections.

Kohler[7] also found agglutinins present in the cerebro-spinal fluid of one out of a total of ten typhoid patients, whereas the same observer records the presence of agglutinins in the blood of non-typhoid patients as well as healthy individuals to the extent of 15 per cent. of the subjects investigated. It would thus appear that the agglutinins encountered by Kohler were not specific typhoid agglutinins.

The work of Cavazzini,[8] Capalleti,[9] Petit and Girard,[10] Meek,[11] and Dixon and Halliburton[12] seems to show that the cerebro-spinal fluid is formed, in part if not entirely, by the secretory activity of the epithelial cells of the choroid plexus, which Mott[13] speaks of as the "choroid gland." Extracts of this body stimulate the secretion of the cerebro-spinal fluid, whereas the quantity of this fluid is not affected by lymphagogues, but is increased by pilocarpine and checked by atropine, and after the injection of pilocarpine the cells exhibit the typical changes met with in active glands after secretion.

Hence we may conclude from a consideration of these experiments that the weight of evidence goes to prove that bacterial antibodies do not pass over, at least in any quantity, into the cerebro-spinal fluid, and that therefore little benefit can be expected to result from the subcutaneous administration of vaccines in cerebro-spinal meningitis.

I beg to express my indebtedness to Captain Davies and to Lieutenant-Colonel Gordon for suggestions and assistance, and to the Medical Research Committee, under whose auspices this investigation was undertaken.

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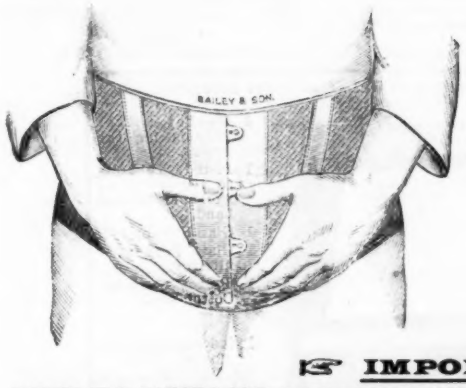

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LITERATURE ON APPLICATION.

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THE LANCET.

LONDON: SATURDAY, MARCH 17, 1917.

The Training of the Disabled Soldier.

THE statement of Mr. BARNES, the Minister of Pensions, which was published in THE LANCET last week, on the provision to be made by the Government for men disabled in the war was not made too soon; it was much expected, and will be welcomed by all interested in the care of the war cripple. The War Office, said Mr. BARNES, has undertaken to retain the disabled man as an in-patient so long as there is accommodation for him, and during this time to provide him with manual curative treatment, or, in other words, trade workshops. In order that the Pensions Ministry may get in touch with the disabled man during his period in hospital, Mr. BARNES has adopted the scheme of the Disabled Soldiers Aid Committee, the voluntary body which for some time past has sent representatives to the various London military hospitals to interview the men before their discharge with a view to helping them to find training in skilled trades and subsequent remunerative employment. This visiting will now, therefore, become a general routine throughout the country and be done by members of the local War Pensions &c. Statutory Committees. After discharge from hospital the War Office has accepted responsibility for the man's further treatment as an out-patient in his own district; failure to accept such treatment will subject the man to the risk of losing half his pension, while the discharged man who trains for a new or more skilled occupation will have the inducement of receiving, in addition to his full pension and allowances, free tuition and a small bonus.

This marks a great advance, but it cannot be said that the scheme, as at present outlined, affords a complete solution of the existing difficulties. One of these, which has been experienced by the military authorities in all combatant countries, is to induce the convalescent men to attend the curative workshops where these exist. In the Hammersmith Military Orthopædic Hospital this difficulty has been solved to a considerable extent by the granting or withholding of the special privileges which appeal to the soldier's mind, such as the wearing of khaki in place of hospital blue and the award of extra leave. Unfortunately, the limbless man does not respond in the same way to these attractions and some other suasion must be applied—a matter for the military authorities rather than the Pensions Ministry to devise. A more concrete difficulty is in regard to the provision of training facilities. It is, of course, possible to provide training in a trade at an existing local technical school or polytechnic, and at the same time medical treatment at another local institution; but it is evident that much effort will be required to coördinate the two, and the cripple will inevitably lose more time each day than if treatment and training were provided under the same roof. At present, too, there is little indication that the local technical institutions are in a position to provide adequate facilities for training except perhaps in the largest centres of population, where, and where only, the different groups of disabled men are sufficiently represented to form classes in the various subjects.

In the direction of continued in-patient treatment, with all its attendant advantages, a promise of better things may be read into Mr. BARNES'S announcement of the formation of a committee directly responsible to the Ministry of Pensions and charged with the task of providing institutional treatment for disabled soldiers after their discharge. The first of these residential institutions which is now approaching completion will deal with a hundred neurasthenics, with whom are to be associated half the number of men who have lost a limb or the use of a limb, the admixture of patients who have only or mainly physical ills to contend with being designed to relieve the mental atmosphere. We may reasonably expect that adequate workshop accommodation is being provided, and that this institution will be the forerunner of others scattered over the country. As the element of treatment is still the most important one in these residential institutions, we cannot help expressing some surprise that Mr. BARNES, in enumerating the personnel of his advisory committee, did not mention the existence of a medical member upon it. There must surely be some officer of a Command Depôt with the necessary experience and administrative ability to qualify for this position. When the advisory committee has done its work we need no longer fear comparison with the French *écoles professionnelles* and the agricultural schools in that country for disabled men. At present, although generous financial provision has been made, the provision of technical re-education of the wounded in this country is below the level of that provided by continental nations, enemy and allied.

Plastic Surgery of the Face.

THE war has afforded sad but great opportunities for the display of surgical skill in the refashioning of the face, and two articles in the present issue of THE LANCET—one by Mr. PERCIVAL COLE and the other by Captain H. D. GILLIES and Captain L. A. B. KING—will serve to show how much may be done by well-directed knowledge and skill in the obliteration of the ravages produced by weapons of war. It was natural that the face should be the region where plastic surgery should first gain successes, for inevitably it would be in this region that the earliest attempts would be made. The classic labours of TAGLIACOZZI were mainly directed to the replacing of noses and lips which had been removed either by injury or by disease. The results of operative interference were here, on the whole, disappointing. In India

at an early date attempts were made to replace lost noses, for in some parts of that country there is much scope for this operation, as slicing off the nose is the recognised method by which an irritated husband signifies his disapprobation of his wife's conduct. Colonel D. F. KEEGAN, I.M.S., has written in our columns and elsewhere very fully on the rhinoplasty designed to repair the husband's brutalities, and it is interesting to see that the treatment of some of our military patients to-day follows some of the methods of technique which he described.

In those wounds of the face inflicted upon patients who have returned to this country from the front for treatment the injury may be confined to the soft parts, in which case the art of the surgeon suffices in most cases to restore the appearance to a very great extent. In the slighter cases it may be sufficient to suture the edges of wounds, when there has been but little loss of tissue; but when the destruction of skin and other tissue has been great, then it becomes necessary to interpose skin from elsewhere to fill the gap, and these flaps may be taken from the neck or even from the chest in the frequent classes of injury where the lower part of the face has been mutilated. The flaps may be transferred by sliding, or transposed by the aid of a pedicle. When the mucous membrane of the mouth is intact, a simple flap of skin is quite sufficient to give good cosmetic results, but when, as occurs in so many cases, more or less of the mucous membrane has been lost it will be essential that a double flap should be employed, one flap being placed with its epithelial surface directed towards the mouth, so as to take the place of the lost mucous membrane, while the other flap is so applied that its epithelial surface is directed outwards. In some cases the raw surfaces of the two flaps are placed together at the same operation, while in others it may be advisable to insert the deeper flap at one operation, while the more superficial piece of skin is not applied until a later date. In both the articles published this week examples of the procedure in question are figured. The great need for the insertion of a flap of skin to replace lost mucous membrane depends on the fact that it is not sufficient to have a good cosmetic result, but it is essential that the functional result shall be perfect, for the operation has been useless if the jaws are held together immovable by a dense mass of cicatricial tissue, such as would follow healing after a great loss of the substance of the cheek were no new tissue interposed. Function in all cases is of more importance than appearance, though nearly always, if due attention be paid to function, the cosmetic result can be made satisfactory by ingenuity, patience, and the intelligent cöoperation of the surgical with the dental expert. Sometimes one plastic operation will suffice; but as a rule more than one operation is needed, and not rarely many are required to obtain the best results. When in addition to the damage to the soft parts the upper or the lower jaw has been injured, the task of the surgeon becomes more difficult still, and in all but the slightest cases he must, in order to attain success, have recourse to the assistance of the dentist. Should there be nothing more than a simple fracture of the jaw it may suffice to keep in position the parts of the broken bone, but nearly always there has been real loss of substance, and it is moreover rare for the fractures not to be compound, and comminution is almost the rule. In circumstances like these some mechanical support is necessary, and this must be provided by the dental expert. Such a support should be applied early, before any elaborate operation is undertaken to close the rent in the lips or cheek; for if it be postponed until some time after the operation is done, already no small degree of contraction will have taken place and the result will not be satisfactory. This point is emphasised by both Captain GILLIES and Mr. COLE. The planning and the fixing of the mechanical support are of the greatest importance and need meticulous care; but the results are commensurate with the care taken, and they are often almost miraculous. A glance at the illustrations accompanying the two papers we have mentioned will show clearly the marvellous improvement which can follow operations for bullet and shell wounds of the face and jaws. There seems to be no well-defined limit to what may be done given the requisite time, and cases which to the uninitiated must appear to be absolutely hopeless, may, after the fitting of dentures or other prosthetic appliances and after one or many operations, show but few and inconspicuous signs of the harm wrought by the projectile. There is one point in the plastic treatment of these extensive injuries to which sufficient attention is not always given, and that is the preservation of the buccal sulcus; for if care be not taken to see that the buccal sulcus is preserved, it becomes exceedingly difficult, if not impossible, to fit a denture to that side of the mouth, and functionally so far the operation has failed, for that side of the mouth cannot be used.

To sum up: In any but the slightest cases and those where there is only injury to the soft parts, it is above all things essential that the surgeon should invoke the aid of the dental expert. The prosthetic appliance needed should be fixed before the healing of the wounds has formed a cicatricial mass which will need stretching if any really useful result is to be attained, for it is far better to prevent cicatricial contraction than to have to stretch the scar tissue after it has formed. With skill and care and time results can be obtained which can hardly be credited by those who have had no opportunity of seeing them.

CENTENARIANS.—Mr. Thomas Pyper, for many years head gardener at Minterne House (Lord Digby's Dorset residence), has recently celebrated the 100th anniversary of his birthday.—Mrs. Anna Rogers, of Falmouth, celebrated the 100th anniversary of her birthday on Feb. 28th.—Mrs. Elizabeth Selley, who was born near Launceston, Cornwall, died at Gloucester on Feb. 2nd in her 102nd year.—Mr. John Hamlin, the oldest resident in Somerset, died at Shepton Mallet on Feb. 5th in his 102nd year.—Mr. James Newth died at the Grammar School House, Dursley, on Feb. 13th in his 103rd year.

Annotations.

"Ne quid nimis."

THE INFLUENCE OF DRESSINGS ON THE ANAEROBIC FLORA OF WOUNDS.

THE Tetanus Committee of the War Office are desirous of obtaining evidence of the persistence of anaerobic bacteria in wounds, and of the effect of various methods of wound dressing on the persistence of these anaerobes. They consider that if a sufficient number of pathologists would make routine observations for a short time upon two or three wounds each, much valuable evidence would be forthcoming, especially if the examinations were carried out in a similar fashion. The Committee therefore suggest a routine method suitable for the examination of one case, which could be extended to other cases during the same period if time permitted. The essential points to be noted for each case are: (I.) The type of dressing in use for the wound examined—e.g., (*a*) hypochlorite solution, (*b*) hypertonic salt solution, (*c*) salt pack, (*d*) peroxide, iodine and normal saline, (*e*) coal-tar derivatives (cresol, &c.), (*f*) flavine, brilliant green, &c. (II.) The presence or absence of spore-forming organisms as determined by: (*a*) direct films of wound discharge; (*b*) anaerobic meat broth cultivations. The following points are to be specially noted. 1. The presence or absence of spore-forming organisms and type of sporulation—e.g., (*a*) end spore, round or oval; (*b*) subterminal end spores (of which a small portion of stained organism can be seen beyond the spore); (*c*) central spores, including clostridial spore; (*d*) motility; (*e*) reaction to Gram's stain, noting morphology of organisms—viz., slender, thick rods, cocci, &c. 2. Changes in the meat medium: (*a*) reddening, (*b*) blackening, (*c*) gas formation, (*d*) digestion. A form of report is being issued to be returned when filled up to Surgeon-General Sir David Bruce, Royal Army Medical College, Grosvenor-road, London, S.W.

THE DIETETIC VALUE OF ROOTS AND TUBERS.

THE prospect of a serious shortage in the potato supply is pressing into service other vegetables of the sort that may be substitutes. The general drawback to them all is the very large percentage of water which they contain compared with the potato. The potato itself contains on an average 75 per cent. of water, which, however, is much the same proportion as is contained in raw meat, while the turnip contains as much as 90 per cent. of water, which is 2 or 3 per cent. more than is contained in a fluid such as milk. The apparent solidity of the turnip is, in fact, remarkable having regard to its large percentage of water. Unlike the potato, however, the turnip or swede contains no starch, the predominant constituent of the potato, the carbohydrates present being in the form of sugar, and in the process of boiling much of this sugar is lost. The same is true of the beet-root, which, of course, is very rich in sugar. The carrot also contains a relatively large amount of sugar, while its percentage of moisture is less than that of the turnip but 10 per cent. more than that of the potato. The parsnip contains even more sugar than the beet, but rather less water. The protein value of all these vegetables is poor; they are valuable chiefly as sources of carbohydrate in the form of sugar. They are bulkier foods than the potato owing to their large holding of water. The onion, containing as much as 90 per cent. of water, shows a small dietetic value, and its mission would appear to be rather that of a condiment than of a nutrient, and a very wholesome and serviceable condiment it is. There is one constituent of root foods which is sometimes overlooked, and which may have a definite dietetic importance, and that is the curious carbohydrate known as pectose, which appears to replace starch in certain vegetables, and notably the turnip. Pectose adds to the mucilaginous character of the puree, and it is the foundation of the gelatinising property of cooked fruit juices. The pectins, in fact, form gels, to use the modern language of colloidal chemistry. It is possible that this property of the pectins renders them a valuable adjuvant in the metabolic process apart from the consideration of a direct carbohydrate value. The word food commonly conveys a substantial material, but we cannot deny the importance of certain constituents in comestibles which, though they may not directly nourish, yet afford valuable, if not essential, assistance in the process of nutrition.

THE LOUSE PROBLEM.

A DISCOURSE was delivered recently on the louse problem before the Section of Epidemiology and State Medicine of the Royal Society of Medicine by Mr. A. W. Bacot, entomologist to the Lister Institute, when the lecturer dealt with a subject of great importance in a thoroughly practical style. After setting out the points in the natural history of lice which concern all questions of prevention or cure of the evils due to lice—for example, their methods of pairing, their proceedings when egg-laying, their fecundity and fertility, their length of life, and their general habits—Mr. Bacot came to the following conclusions:—

Eggs take 7 or 10 days to hatch under normal conditions—i.e., in clothing that is constantly worn; if discarded and allowed to cool for a period each day the time of hatching may be extended for five weeks.

Active lice can exist without food, and apart from any host, for periods of up to 9 days.

Young lice take from 10 to 14 days to attain sexual maturity.

Females, after attaining maturity, require 2 to 4 days before they commence to oviposit.

Egg production cannot take place without food, or under cool conditions (below 65° F.).

Eggs laid by unpaired females do not hatch.

Impregnation is not effective for more than 20 days.

As many as 10 or 12 eggs per day may be laid by each female.

A total of 300 eggs may be laid by one female.

The female after maturity may live for 46 days.

Before the close of her life a single female may have 4160 living offspring.

With regard to prevention Mr. Bacot pointed out that lousiness is a sign of a low standard of civilised life, and that the circumstances of war, by rendering the washing and changing of garments and bedding an erratic or occasional proceeding, produces such a standard on all the war fronts. The louse problem is solved, he suggests, in proportion as the armies are able to conduct campaigning under a civilised standard of life, which may be possible where the battle-front is more or less fixed and contiguous to resourceful bases, as in the West, but quite impossible where it is in motion, or relying upon long lines of difficult transport. Mr. Bacot, who has a neat turn of expression, pointed out that "it is one of the peculiarities of the destruction of insects that economy of thought

and extravagance in practice should be so general," and he finds that to the troops actually in the trenches the authorities have not had the prudence to issue a sufficient supply of insecticides, and have not recognised that, while all the known insecticides are defective in one direction or another, their imperfections may be counterbalanced by complementary use. Many of these preparations, employed by themselves, represent vain extravagance, but reinforced by others they constitute a valuable part of treatment. Slow acting and relatively stable remedies should be used together with those of quick action though short duration. In his opinion the treatment of discarded clothing should, wherever possible, be by dry heat, and, still with an eye to waste, he tells the story of an experimenter who found that "cyllin water when cool was not effective, but became so when heated to 60° centigrade"—it had already been pointed out in his own paper that dry heat at 60° centigrade killed the nits.

Mr. Bacot's experiments upon insecticides were carried out upon his own person by the suspension between shirt and skin of gauze bags containing active lice; while in order to gauge the comparative value of a number of different remedies under practical conditions, and to determine their range of action, he constructed an apparatus to suspend in front of the body so that insects could feed during the progress of the tests. He came to the conclusion that however valuable and interesting from the view of pure science many of the published papers concerning the relative efficiency of various substances may be, they have but small practical value, owing to a want of appreciation of the essential facts connected with their use—namely, that remedies have to be applied between the clothing and surface of a more or less rotund body, the temperature condition there being in the neighbourhood of 87° to 92° F. What effect their vapour may have in closed tins, under bell jars, or when the lice are suspended within a short distance above the insecticides is beside the question; all depends, he shows, upon the concentration and duration of the vapour caused by the quantity applied to any given area, and the effective diffusion range around this area.

A DOUBLE RADIAL ARTERY.

AN instance of this very rare condition has recently been observed by Professor Edward Fawcett in the dissecting-room of the medical school attached to the University of Bristol. It was also associated with high bifurcation of the brachial artery, a condition which may usually with certainty be ascribed to persistence in some form or other of a vas aberrans. This high bifurcation is, in Professor Fawcett's experience, frequently associated also with an increased number of heads of origin of the biceps muscle. In this case three heads of origin were present.

The vas aberrans left the brachial artery at the lower border of the tendon of the teres major muscle, ran downwards superficial to the median nerve, and at about the middle of the upper arm crossed the superficial surface of the biceps to reach its outer side at the bend of the elbow. Below this point it bifurcated into two branches of equal calibre, one, more medial, which ran the course usually associated with the radial artery, the other, more lateral, which running by the side of the radial vein superficial and lateral to the brachio-radialis muscle at the junction of the middle and lower thirds of the forearm was joined company by the radial nerve, and with it reached the back of the wrist. The branch first described turned backwards under the tendons of the extensor ossis metacarpi pollicis and extensor brevis pollicis, having previously given off the anterior radial carpal and superficial volar branches; later it terminated under the extensor tendons at the back of the wrist as the posterior carpal artery, previous to which having given off the dorsal arteries of the thumb. The branch secondly described, having reached the wrist superficially, at once made for the proximal end of the first interosseous space, through which it passed to form the deep palmar arch, previous to which it gave off the dorsal artery of the index finger. From their behaviour and their equality in size one is justified in regarding each of these branches as a radial artery, hence the superscription—double radial artery.

The condition is naturally one of some interest to clinicians. Professor Fawcett states that he has not once met with it in a period of 30 years' dissecting-room experience, although he has been asked if such condition might exist by more than one clinician.

THE TENNENT CHAIR OF OPHTHALMOLOGY.

Dr. Gavin Paterson Tennent, who died in 1913, left £25,000 to the University of Glasgow for the establishment of a department of ophthalmology and for the foundation of a chair of Ophthalmology in the University. The salary of the new professor has been fixed at £500 a year, and his duties are "to apply himself to the promotion of higher study in ophthalmology and to the advancement of knowledge by means of scientific observation and research in relation thereto." The election to the chair is vested in a board of seven curators, four to be nominated by the University Court and three by the directors of the Western Infirmary. Glasgow and ophthalmology alike are to be congratulated on this munificent endowment. Glasgow is admirably adapted for the purpose, since it possesses a large and flourishing medical school and has a wealth of clinical material. There is therefore every probability that the Tennent Fund will be put to the most advantageous use, for it is of the greatest importance that the more purely scientific aspects of advanced medical studies should be kept in intimate touch with practical clinical work. We noted recently that a University Court ordinance has been presented for the foundation in Edinburgh of a chair of Tuberculosis, showing that this opinion is shared by the Scottish leaders of thought.

FACTITIOUS ELEPHANTIASIS.

AT a recent meeting of the Académie de Médecine of Paris Professor Meriel, of Toulouse, called attention to what appears to be a new factitious condition, induced for the purpose of avoiding military service. Among the wounded who came before a military board of which he was a member he saw a number of cases of elephantiasis of the limbs, predominating at the extremity, which followed a slight injury of warfare, such as wounding by a small fragment of shell or a burn of the second degree. The enormous œdematous infiltration, much out of proportion to the gravity of the injury, excited surprise. When a series of such cases came before him he began to investigate them. He found that the œdema was induced by constriction of the limb for several days with a bandage. In some cases a layer of cotton-wool was first interposed so as to prevent any marks of the bandage. Even when no trace of constriction could be found the appearance was characteristic; the œdema was sharply demarcated near the root of the limb by an elevated margin. This is never present in œdema due to

disease. The proposal to apply a plaster apparatus or its application often led to avowal of the cause. If it did not, the rapid disappearance of the œdema under the apparatus betrayed its origin. When the œdema was recent it was entirely curable, but when it had been maintained for a long time trophic lesions which did not disappear, or took a long time in doing so, were the result. The œdema affected the hand or foot and extended up the forearm or leg. It was of variable consistence, sometimes hard, but more often pitting on pressure. The skin of the affected part was glossy, thinned, cold, sometimes bluish, and at other times white. Whatever the upper limit the œdema terminated by a well-marked ridge above which the tissues were quite sound. Movements of the fingers were much diminished, and the fingers themselves were enlarged and separated from one another by the enormous lymphatic infiltration. The latter produced in the long run trophic lesions. Their existence was shown by radiography, which revealed decalcification of the bones of the hand and foot which was exactly the same as in a recent work on nerve lesions Madame A. Benisty has figured in a case of wound of the median nerve. In both cases the decalcification predominated in the phalanges and the head of the metacarpal bones. It is important to note that the œdema is not due to the neuritis, but the neuritis to the œdema. The neuritis does not recede as quickly as the œdema, but outlasts it for a greater or lesser period producing a disability desired by the subject. The diagnosis can be made by isolating and watching the patient so as to prevent him from constricting the limb or by enveloping the latter in plaster-of-Paris, which in the case of the lower limb should reach up to the pelvis and in the upper limb to the chest.

THE CHEMISTRY OF WAR-TIME WHISKY.

THE dilution of spirits with water, and particularly of malt whisky, down to the degree demanded by the Defence of the Realm Act has effected some important changes in the characteristics of this alcoholic liquor which are worth notice. It may be remembered that present supplies to the public cannot be sold at a greater alcoholic strength than 30° under proof spirit, which means about 33 per cent. of alcohol by weight or 40 per cent. by volume (70 per cent. proof spirit), whereas before any demand for dilution came into force the average strength of the spirit sold was about 40 per cent. by weight of alcohol or 48 per cent. by volume (84 per cent. proof spirit). This means that 20 gallons of water may be added to 100 gallons of the old-strength whisky to produce 120 gallons of a spirit diluted in accordance with the requirements of the Act. The dilution amounts, in fact, to the addition of about a fifth part water, so that a dozen bottles of the old-strength spirit would make about 14 bottles of the diluted spirit. If whisky were pure alcohol this dilution would give no trouble, but, as everyone knows, genuine malt whisky is not pure alcohol; it is a complex containing certain by-products of fermentation and distillation held in solution in the alcohol. Just as with tinctures the addition of water throws out oils and other active substances, so it happens with malt spirit. Fatty substances, resins, and other products contrive to make the spirit opalescent when water is added to the extent demanded and when allowed to stand. The subsequent elimination of these substances by filtration carries out a material portion of the flavouring substances derived from the malt, and the ethers are to some extent destroyed by this process. This is what the merchants have been compelled to do; it was easy enough to water down the malt spirit to the required standard, but the mixture became opalescent and had to be carefully filtered before it could be bottled in a satisfactory condition. The result is that the whisky now supplied to the public is bright and clear and remains so even on further dilution, while much of the characteristic malty flavour has been withdrawn. This change in the character of whisky may have its hygienic advantages, inasmuch as it may not satisfy the taste of the habitual consumer, and may induce him to drink it less frequently or not at all.

THE FREE SUPPLY OF ANTITOXIN IN CANADA.

THE Provincial Board of Health for Ontario has now completed a contract for a year for the supply of diphtheria antitoxin, tetanus antitoxin, anti-meningitis serum, small-pox vaccine, and Pasteur preventive treatment for rabies. We announced early last year the intention of the Board to make a gratuitous distribution of these serums, and our readers will like to know the details of such an example of public forethought. These serums, as well as mixed typhoid and paratyphoid vaccines, have been supplied free to the public all over the province of Ontario. Diphtheria antitoxin costs the Board 15 cents per 1000 units, in vials, tetanus antitoxin 30 cents per 1000 units, in vials, anti-meningitis serum $1 per 20 c.c., small-pox vaccine 4 cents per capillary tube, and Pasteur treatment $15 per person treated. Mixed typhoid and paratyphoid vaccine is prepared and supplied free by the Board's laboratory, in Toronto. The aggregate cost of supplying the province for the year is about $40,000, or about one-quarter of the cost under commercial prices. All these products, except typhoid vaccine, have been, and will be for the future, obtained from the University of Toronto, and are prepared at the Connaught antitoxin laboratories about 12 miles outside of the city. Since the war began the Board has supplied all the typhoid and paratyphoid vaccine used by the Canadian troops (some 400,000 doses) free of charge. The enterprise of the Board has been the subject of well-deserved appreciation from the public and the medical profession.

Colonel J. T. Fotheringham, C.M.G., who came over in medical charge of the 2nd Canadian Division, has been invited to deliver the next Cavendish Lecture of the West London Medico-Chirurgical Society about the middle of June. The subject of the lecture will be the modern organisation of the medical service at the front.

LITERARY INTELLIGENCE.—The first number has just appeared of a new journal of general physiology, *Archives Néerlandaises de Physiologie de l'Homme et des Animaux*, edited by W. Einthoven, H. J. Hamburger, C. A. Pekelharing, G. Van Rijnberk, et H. Zwaardemaker, and forming part of a series of scientific archives published by La Société Hollandaise des Sciences à Harlem. Four numbers make up the volume, for which the subscription is 15 florins payable to Martinus Nijhoff, Lange Voorhout 9, The Hague, Holland.

THE CONTROL OF VENEREAL DISEASES.

The Preventive Treatment of Venereal Diseases in Australia.

Temporary Lieutenant-Colonel James W. Barrett, R.A.M.C., has sent us the following letter for publication:—

In consequence of the appearance of a leading article in your issue of Jan. 13th on the subject of venereal prophylaxis, I venture to place your readers in possession of the facts relating to the steps which have already been taken in Australia. In the State of Victoria the Government has done much in the direction of investigating the extent of distribution and in educating the public respecting the nature of venereal diseases. The Governmental action was the result of a medical campaign of 20 years' duration, details of which are set out in the Proceedings of the various sessions of the Australian Medical Congress and in an article written by myself and published in Bedrock early in 1913. It was the action of the Victorian Government which, to some extent, influenced the appointment of the British Royal Commission. In 1914, however, it was found that the Government was hesitating respecting publication of the methods relating to prophylaxis, and consequently a small committee of medical men and women (of which I was a member) was formed and determined to take action on their own responsibility. They accordingly drafted the appended circular and arranged with the leading chemists in Melbourne to supply the articles necessary for the prophylaxis of venereal diseases, and to issue the leaflet with the articles purchased.

Before doing so, however, information relating to the step proposed to be taken was sent to every medical practitioner in the State of Victoria and to every member of the clergy, with a request for an expression of opinion whether a better method could be devised. A conference with the representatives of the Council of Churches made it clear that, whilst the clergy disliked the proposal, they were unable to suggest any alternative method; action was accordingly taken. In the course of the discussion the medical representatives made it abundantly clear that the principles which must underlie the suppression of venereal diseases are: 1. The complete separation of the moral from the medical problem, and the clear recognition of the fact that the world will not be rendered more or less moral by the abolition of venereal disease. 2. The fact that the fear of the acquisition of venereal disease is no effective deterrent to immorality; to such slight extent as it is a deterrent the advantages are more than counterbalanced by the wholesale infection of the innocent which goes on at present. 3. That as the organisms which cause venereal diseases grow almost exclusively in the genital passages of men and women, it is quite clear that the intelligent use of prophylaxis would in a very few years eliminate these diseases altogether; in fact, it is doubtful whether there are any other contagious diseases which could be eliminated with greater certainty.

It is to me an article of faith, fully discussed in the literature referred to, in the *Australasian Medical Journal*, in the columns of the Melbourne *Argus*, and elsewhere, that a resolute and straightforward attack on this problem on the lines of prophylaxis offers the only reasonable means of extirpating these diseases. The other and indirect means of dealing with it have a value, and education respecting the nature of the diseases is especially useful, and it is the lack of knowledge on the part of the public which has caused the failure of past campaigns. Yet these means alone are somewhat disappointing in their results as our experience indicates. The words used by Huxley in another connexion may be applied with great force to this colossal evil: "There is no alleviation for the suffering of mankind except veracity of thought and action, and the resolute facing of the world as it is, when the garment of make-believe by which pious hands have hidden its uglier features, is stripped off."

May I commend the foregoing to the consideration of earnest men and women who are now publicly facing this disagreeable but vital undertaking.

The Australian circular runs as follows:—

WARNING: VENEREAL DISEASES.

Irregular sexual intercourse involves a considerable liability to infection with gonorrhœa, or syphilis, or both. Of those who are infected a portion are never cured; the consequences are serious so far as they are concerned, and still more serious as regards those to whom they may communicate these diseases later on. A single exposure to infection may result in life-long illness.

Incontinence is not in any way necessary for purposes of health, and the advice the medical profession would give to all would be abstinence from intercourse other than in marriage. If you desire in the future healthy children and a healthy wife, you are strongly advised to remain continent; at the same time, if you determine to take the risk, it is your duty, not only for your own sake, but for that of other people, to avoid infection, and infection can be avoided or lessened in frequency by following the procedure indicated in the following.

Instructions for men.—Immediately after intercourse thoroughly wash the genitals with soap and water, pass urine, and then dry the parts, especially the opening of the passage. The washing must include the parts under the foreskin, which must be drawn back. Then dip the wisp of cotton-wool into the liquid supplied and gently pass it into the opening by a twisting movement; pass it in for a quarter of an inch, and allow it to remain in position for three or four minutes before removal. If the opening or "eye" of the penis is so small that this cannot be done a few drops should be inserted with a medicine-dropper. The ointment is then to be used by rubbing it in thoroughly and firmly over the whole penis, but more particularly the head, especially if a crack, abrasion, or small tear is noticed anywhere. The foreskin must be drawn back to allow of this being done properly. A small portion of the ointment should be allowed to remain in opening of the canal. The value of these simple precautions depends on the rapidity with which they are adopted after intercourse. The sooner these steps are taken the less is the risk of infection. The applications should be made in the order indicated. The longer they are deferred the greater the risk.

Instructions for women.—If there has been any risk of infection as soon as possible after connexion douche well, using a quart of hot water and putting into it two teaspoonfuls of tinct. of iodine. Then smear the calomel ointment round the outside of orifice and well up over the front.

The ointment: 30 per cent. calomel; the solution: 20 per cent. argyrol. (This may be made into a jelly with glyco-gelatine.) These articles are now sold by leading chemists.

Resolution of the Royal Society of Medicine.

At a recent meeting of the Council of the Royal Society of Medicine the following resolution was unanimously passed:—

That, in view of the grave national dangers arising from the neglect, or the improper treatment, of venereal diseases, the Council of the Royal Society of Medicine is strongly in favour of legislation for the purpose of rendering it a penal offence for any person other than a registered medical practitioner to treat or advise concerning the treatment of these diseases, or to sell, supply, or dispense drugs as a remedy for venereal diseases, unless the said drugs are supplied on the prescription of a registered medical practitioner, and only for the exclusive use of the person for whom the said prescription was intended.

The Y.M.C.A. and Venereal Diseases.

The recent report of the Microscopical Section of the Y.M.C.A. to the National Council of Associations states that there is much evidence among the men in camp that venereal diseases are spread through ignorance and thoughtlessness. At the exhibitions one member of the party makes it his duty to exhibit bacteria, and amongst them the germ of syphilis, with a view of opening a discussion among the men on the subject. The younger soldiers and sailors invariably put questions indicating a belief that brothels can be visited with impunity. Statements of fact illustrated by the microscope are then made by the exhibitor to show that such beliefs are unfounded and likely to lead to disaster.

Outfit for the Treatment Centre.

With commendable enterprise the Holborn Surgical Instrument Company (26, Thavies Inn, London, E.C.) have issued a 16-page catalogue of apparatus and remedies suitable for a venereal treatment centre. The cover describes the "606 Apparatus, Military Outfit," as used at the Military Hospital in Rochester-row; two pages follow on syringes and needles; then the drugs, new and old, in various forms; general apparatus, urethral instruments, a special "606 table" with hinged arm rests; ending with a complete estimate of the outfit required under three heads: (1) the 606 and mercurial injection room; (2) the gonorrhœa treatment room; (3) apparatus for the Wassermann test and dark-ground work. The list will be of use to centres not already fully equipped.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

The Aphonia of War and Laryngeal Tuberculosis.

AMONG the accidents attributable to the war one of the most unexpected and difficult to interpret is aphonia. It is not a rare accident. Dr. G. Liébault, chief of an oto-rhino-laryngological centre, has made a special study of these cases. Some of them may be attributed to a nervous traumatism caused by the bursting of the shells, but the majority of patients state that their aphonia has followed on the fatigues and chills of trench life. The diagnosis of simple nervous aphonia has frequently been established, but many also are under suspicion of a commencing laryngitis. When transferred from service to service these men are incompletely treated and do not improve. They are as a rule exhausted; they have often been several months in the trenches; they are thin, physically depressed, and in need of rest; they have a cough and a hoarse voice. It is natural for the doctor who sees them to conclude that the bronchitis

and laryngitis, along with fatigue and emaciation, are evidence of a tuberculous affection. It is, however, imperative that the larynx should be completely examined, and it may then be found that the patient is by no means tuberculous. M. Liébault has successfully treated ten soldiers who had been under care at several hospitals and were well on their way to being discharged. Without exhaustive examination these cases should not be labelled as bacillary and discharged.

Extraction of Projectiles.

M. René le Fort has several times essayed with success the extraction of projectiles from the root of the lung. He considers the best means of access is the anterior flap, comprising the second, third, fourth, and even the fifth ribs, and turned outwards. The lung may readily be displaced, and both surfaces of the hilum reached from before and behind. The after-treatment of the operation, which may itself be critical, is generally simple, although the interference is more serious than in the case of projectiles in the body of the lung. To reach projectiles situated on one or other side of the vertebral column in front of the transverse processes M. Salva Mercadé holds that the sub-peritoneal route presents undoubted advantages. The peritoneum is easily separated, and when turned back with the contained viscera an extensive view is obtained of the posterior abdominal wall. M. Mercadé employed this method on a man sent to him with a radiographic note stating that the projectile was situated 7 cm. deep from the anterior abdominal wall measured from a point two finger-breadths below and to the right of the umbilicus, and 8 cm. from the posterior surface of the body. The projectile was found in the psoas at the level of the fourth lumbar vertebra, and the patient made a good recovery.

Artificial Limbs and Muscular Re-education.

Professor Amar, analysing, by means of his dynamographic footpath, the locomotion of amputation cases, has thus passed under review various types of prothesis—artificial legs, articulated and rigid, orthopædic boots, and the like—supplied for amputations of thigh, or leg, or for crippled feet. He finds that the curves of effort registered show that at present no model, either French or foreign, has realised conditions of walking approaching the normal. The characteristics of the pathological gait are still to be noted; inertia, lack of stability, compass movement of the legs in progressing, and rapid fatigue. From Professor Amar's tracings it results that, in spite of half a century of experience, the artificial lower limb is still highly irrational and little in harmony with the physiological laws of locomotion and of the conservation of energy. Dr. Charmot has made a study of the professional re-education of one-armed agricultural labourers. According to the latest figures agricultural labourers make up nearly two-thirds of the war cripples' and of amputation cases the upper limb accounts for about two-thirds. Thanks to modern artificial aid, it can be safely affirmed that all labourers retaining as much as one-third of the crippled arm can and should remain in agricultural pursuits after suitable re-education. To control the results obtained competitions have been organised by the Society of Technical Instruction of the Rhône and the Association of Assistance of the Mutilated at Lyons. At the first of these meetings 12 men presented themselves. They were required to dig and to reap. In digging, those who had lost an arm got through their work in a shorter time than those who had lost a forearm, and even than normal men. The second fact is explained by the intensity of work due to competition, and the first by the fact that the movements of an arm stump are simpler and more limited than those of a forearm stump. In reaping, those who had lost an arm or a forearm reaped 4 ares in about an hour, while a normal individual, doing average work, only reaps in the same time 3½ ares. Of course, in a competition the work is of short duration and intensive. But tests of longer duration were also tried. Thus four one-armed patients reaped between them in three days 1½ hectares working from five and a half hours to six hours a day. These men rapidly reach the stage of doing whole days' work without fatigue. Their mental outlook is a matter of importance. They are easily distressed, often embittered. This must be borne in mind and their training based on physiological data, taking care never to reach the limit of fatigue, and to surround the crippled with an atmosphere of sympathetic encouragement.

THE SERVICES.

ROYAL ARMY MEDICAL CORPS.

Temp. Capt. F. J. Ewing, C.A.M.C., to be Deputy Assistant Director of Medical Services.

Lieut.-Col. G. A. Moore, C.M.G., to be temporary Colonel whilst employed as Assistant Director of Medical Services of a Division.

The undermentioned to retain the acting rank of Lieutenant-Colonel: Capt. T. S. Eves, whilst commanding a Field Ambulance; Major D. O. Hyde, D.S.O., whilst commanding a Casualty Clearing Station; Major B. B. Burke, D.S.O., whilst commanding a Stationary Hospital.

To be acting Lieutenant-Colonels whilst commanding a Field Ambulance: Capt. T. H. Scott, M.C., and Temp. Capts. F. F. Muecke, L. D. Shaw, R. B. Drake-Brockman.

Major William Riach, C.M.G., to be acting Lieutenant-Colonel whilst commanding a Casualty Clearing Station.

To be temporary Majors: C. Christie and Temp. Major W. H. Laughlin, C.A.M.C.

Capt. B. Biggar is seconded for service with the Egyptian Army.

To be temporary Captains: A. G. Leitch, T. S. G. Martin, R. S. Miller, A. R. J. Douglas, H. Hebblethwaite (Major T.F.R.), T. J. Burton, F. A. Murray, H. J. Cooper, and temporary Lieutenants E. Baldwin, T. Davidson, J. H. Patterson, J. S. Dickson, W. T. Patterson, G. Collins, J. R. Briscoe, P. W. Brigstocke, H. W. Barber, H. E. Williams, P. R. Eskell, H. M. Wilson, H. R. Davies, H. N. Rankin, L. F. West, C. H. G. Philp, W. O. Roberts, H. P. Calthness, H. Gardiner-Hill, W. H. Hart, H. A. Boyle, S. E. Bethell, C. A. L. Evans, A. C. MacKay, W. Corbet, J. H. Waterhouse, E. R. Dermer, J. B. Robertson, G. M. Vevers, G. O. Hempson, J. B. Stevenson, W. J. Dilling, K. T. Limbery, L. R. Pickett, A. McCawley, D. J. Evans, J. A. Tippett, P. H. Young, E. B. Barnes, J. B. Rae, J. M. Ross, C. I. Hannigan, O. W. Gange, J. G. Leslie, C. D. Coyle, L. G. Reynolds, G. L. Pillans, W. L. Paterson, D. J. Bedford, A. F. Wilson-Gunn, W. H. Pearse, A. Traill, M. Moran, A. R. Mitchell, W. O. Welply, J. M. Stalker, D. Crellin, P. Black, L. F. Hirst, R. C. Hewitt, J. C. O'Farrell, E. G. Dingley, P. H. Wells, A. L. McMaster, W. M. Christie, W. G. G. Coulter, D. G. MacArthur.

To be temporary Lieutenants: H. E. Batten, E. Whalley, J. L. D. Lewis, G. T. Watson, D. Lynch, W. M. Oakden, W. J. Oliver, J. M. Dickson, C. G. Lees, J. G. Reidy, C. L. Ievers, H. B. Emerson, R. M. Liddell, H. H. Moyle, J. C. Jones, F. R. Mathews, C. J. Marshall, R. S. Drew, D. F. Brown, W. Venis, H. N. Wright, R. J. Lytle, J. F. Allen, V. J. Bonavia, I. C. Edwards, C. P. Crouch, W. Grier, C. B. Richardson, V. M. Walsh, J. S. Byrne, W. T. Harris, J. F. Blackett, E. M. Brown, H. H. Bywater, H. Harrison, G. H. U. Corbett, P. M. Tolmie, F. Humphreys, C. A. R. Nitch, J. W. Shields, A. H. H. Barclay, P. W. L. Andrew, J. P. Grainger, J. N. Beadles, L. C. Rorke, S. H. Davison, J. P. Ryan, J. Holland, J. Good, A. G. Harvey, E. E. Owens, C. H. Bannerman, P. Quinn, N. B Stuart, J. T. Titterton, A. B. Moffatt, P. L. Hope, A. R. H. Geyer, D. R. Acheson, R. Stewart, W. L. Nicholson, W. Butterley, M. P. O'Brien, J. Martin, R. C. Hutchinson, F. R. Smyth, P. Allan.

W. B. Hayes, temporary honorary Lieutenant whilst employed with No 8 British Red Cross (Baltic and Corn Exchange) Hospital.

Officers relinquishing their commissions: Temp. Hon. Capt. R. S. Bernard (Fleet Surgeon, R.N., retired), Temp. Capts. F. W. Hird, R. D. Rankin (Can. A.M.C.), W. S. Heron, H. W. Doll, W. T. James, S. B. Faulkner, E. L. Mansel, P. W. White, J. P. Fitzpatrick, H. A. Gillespie, J. T. Smeall, S. G. Tippett, H. W. Ward, M. M. Townsend.

To be temporary Lieutenants: J. E. Carmichael, G. Hart, C. B. Cameron, L. Page, E. M. Ashcroft, H. E. Allanson, N. A. Boswell, W. Hughes, J. E. Bromley, H. N. Ingram, J. S. Mullan, J. K. Garner, T. T. O'Callaghan, D. M. Hunt, J. Penmann, E. C. E. Barnes, A. C. D. Newton, J. McHaffie, N. Garrard.

Temp. Hon. Capt. H. W. Carson, having ceased to be employed with No. 10 British Red Cross (Lady Murray's) Hospital, relinquishes his commission.

SPECIAL RESERVE OF OFFICERS.

Capt. R. T. C. Robertson to be acting Lieutenant-Colonel whilst commanding a Field Ambulance.

Lieut. (on probation) T. Parr is confirmed in his rank.

To be Lieutenants: E. A. C. Langton, F. R. Leblanc, A. A. Fitch (from University of London Contingent, O.T.C.), R. Woodside, G. M. Herriott, A. A. Pritchard, and J. W. Gordon and J. A. Tolmie (from Edinburgh University Contingent, O.T.C.).

TERRITORIAL FORCE.

To be acting Lieutenant-Colonels whilst commanding a Field Ambulance: Capt. H. K. Dawson, Major P. R. Ash, G. W. Miller, H. E. Corbin.

To be acting Lieutenant-Colonel while commanding a Casualty Clearing Station: Major R. Stirling.

Major (temp. Lieut.-Col.) T. Holt relinquishes his temporary rank on alteration in posting.

Capt. (acting Lieut.-Col.) F. Coleman relinquishes his acting rank on ceasing to command a Field Ambulance.

Capt. (temp. Major) A. Don relinquishes his temporary rank on alteration in posting.

Capt. (acting Lieut.-Col.) S. F. Linton relinquishes his acting rank on ceasing to command a Field Ambulance.

Capt. (temp. Major) A. Elliot to be Major.

Lieutenants to be Captains: J. Anderson, R. W. Nevin, L. A. Celestin, D. F. Torrens.

W. E. Evans, from Royal Highlanders (T.F.), to be Lieutenant.

Major E. H. Myddelton-Gavey relinquishes his commission on account of ill-health, and is granted permission to retain his rank and wear the prescribed uniform.

Lieut. C. E. Proctor resigns his commission.

Major R. J. R. C. Simons, Ret. List, R.A.M.C. (T.F.), is granted the honorary rank of Lieutenant-Colonel.

[VOLUNTEER FORCE.

Temp. Second Lieut. G. Cowen, Surrey Volunteer Regiment, 5th Battalion, and O. R. M. Wood, Suffolk Volunteer Regiment, 2nd Battalion, to be temporary Lieutenants and Medical Officers.

J. H. Rowe (late Lieutenant, R.A.M.C.), Yorkshire West Riding Volunteer Regiment, 21st Battalion, to be temporary Lieutenant.

JOURNAL OF THE ROYAL ARMY MEDICAL CORPS.

Wounds of the knee-joint, though apparently trivial, may give rise to serious complications and present many anxious problems to the surgeon. From this point of view Temporary Colonel Andrew Fullerton, C.M.G., consulting surgeon to the British Expeditionary Force, contributes a useful and well-illustrated article on the surgical anatomy of the synovial membrane of the knee-joint to the February issue of the *Journal of the Royal Army Medical Corps*. Temporary Lieutenant E. D. Adrian continues his investigations on the electrical reaction of muscles before and after nerve injury. There is a further instalment of the inquiry by Lieutenant-Colonel C. M. Wenyon and Captain F. W. O'Connor into problems affecting the spread and incidence of intestinal protozoal infections of British troops and natives in Egypt, with special reference to the carrier question, and the treatment of amœbic dysentery; an account is given of three new human intestinal protozoa. In this connexion it may be mentioned that Lieutenant-Colonel Wenyon contributed to our columns in 1915 (vol. ii.), a valuable article on the common intestinal protozoa of man, while further notes on the subject, with illustrations, appear from his pen in the same volume. Among other papers of interest is one by Major Alfred J. Hull on the treatment of gunshot wounds by packing with salt sacs, and another by Major A. F. Hurst on Trench Fever: a Relapsing Fever among the British Troops in France and Salonica. Each of these papers was sent to both the *Journal of the Royal Army Medical Corps* and to THE LANCET for publication, the first appearing in our issue of May 27th, 1916, p. 1077, and the second on Oct. 14th, 1916, p. 671, though in the present instance Major Hull's paper is reinforced by notes of cases, clinical charts, and other illustrations. Many readers will welcome the reappearance of the contributions from Colonel R. H. Firth under the title "Some Musings of an Idle Man."

URBAN VITAL STATISTICS.

(Week ended March 10th, 1917.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 18,000,000 persons, the annual rate of mortality was equal to 17·1, against rates declining from 22·5 to 18·4 per 1000 in the three preceding weeks. In London, with a population exceeding 4,000,000 persons, the death-rate was 13·5, or 0·5 per 1000 above that recorded in the previous week; among the remaining towns the rates ranged from 7·7 in Edmonton, 8·8 in Dewsbury, and 9·5 in Walthamstow, to 25·6 in Dudley, 27·4 in Warrington, and 29·0 in Hastings. The principal epidemic diseases caused 340 deaths, which corresponded to an annual rate of 1·0 per 1000, and included 179 from measles, 56 from infantile diarrhœa, 48 from diphtheria, 44 from whooping-cough, 9 from scarlet fever, and 5 from enteric fever. The deaths from measles showed a further increase on the numbers in the six preceding weeks, and caused the highest annual rates of 1·8 in Bolton and in Oldham, 2·7 in Acton, 3·0 in Wigan, and 4·1 in Dudley. The 311 cases of scarlet fever and the 1472 cases of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were respectively 18 below and 6 in excess of the numbers at the end of the previous week. Of the 5692 deaths from all causes in the 96 towns, 168 resulted from violence. The causes of 51 of the total deaths were uncertified, of which 9 were registered in Liverpool and 6 each in Birmingham and Manchester, but only 2 in London.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual death rate was equal to 16·7, against 19·6 and 17·9 per 1000 in the two preceding weeks. The 352 deaths in Glasgow corresponded to an annual rate of 16·4, against 18·5 per 1000 in London, and included 16 from whooping-cough, 7 from measles, 2 each from diphtheria and infantile diarrhœa, and 1 from scarlet fever. The 104 deaths in Edinburgh were equal to a rate of 16·3 per 1000, and included 5 from whooping-cough, 4 from measles, and 1 from diphtheria.

Irish Towns.—The 186 deaths registered in Dublin were equal to an annual rate of 24·3, or 1·2 per 1000 less than that recorded in the previous week, and included 17 from measles, 4 from infantile diarrhœa, 3 from whooping-cough, and 1 from enteric fever. The 184 deaths in Belfast corresponded to a rate of 24·4 per 1000, and included 7 from measles, 3 from enteric fever, 2 from infantile diarrhœa, and 1 from diphtheria.

CORNWALL INSURANCE COMMITTEE AND UNREGISTERED DENTISTS.—At the last meeting of the Cornwall Insurance Committee it was reported that the Sanatorium Committee had recommended that no action be taken in the matter of a letter sent by the secretary of the Panel Committee. This communication referred to the action of the committee in requiring medical men, under exceptional circumstances, to meet unregistered dentists, and pointed out that such action was entirely contrary to the rules of the General Medical Council. It was mentioned that the reason why the Sanatorium Committee had advised no action was because they had no intention of using the services of any unregistered dentists.

THE LATE THOMAS KNOX, L.R.C.P. & S. Irel.—The death occurred on March 2nd, at his residence, of Mr. Thomas Knox, who for the past 35 years has been medical officer of Lisnaskea Dispensary District and Workhouse and Fever Hospital, county Fermanagh. He was also medical officer of health of Lisnaskea Union and medical attendant of the Royal Irish Constabulary. Mr. Knox was educated at the medical school in Dublin attached to the Royal College of Surgeons in Ireland, and became a Licentiate of that body and of the Royal College of Physicians of Ireland in 1874. He was 66 years of age and was a deservedly successful and popular practitioner.

Correspondence.

"Audi alteram partem."

EARLIER POST-OPERATIVE RAYING OF BREAST CANCER.

To the Editor of THE LANCET.

SIR,—I am very glad to see the letter from Mr. J. J. Grace advocating the earlier post-operative raying of breast cancer. I have been keenly interested in this matter for many years, and as far back as the spring of 1911, in a paper read before the West London Medico-Chirurgical Society, I strongly advocated the administration of a massive dose of the X rays to the site of operation before the closure of the wound, as this seemed the only logical development along the lines then practised. No serious objection has been raised to this suggestion, and to a radiologist at least it is difficult to understand why surgeons have been so reluctant to adopt this more generally. Even yet there are a few who do not have their breast cases X rayed after operation and even advise against it. As Mr. Grace points out, the surgical technique of these operations has been so elaborated that it approaches perfection, yet local recurrence takes place with undesirable frequency. No amount of skill and care will enable any surgeon to be quite sure that he has removed every trace of malignancy from an operation area, but he will greatly increase the patient's chance of a permanent cure by calling in the aid of the radiologist promptly, and what is equally important, leaving him to do his part of the work in his own way. The radiologist knows and understands the tools he is working with, and may be trusted to do no more and no less that his experience has taught him.

Probably no class of work presents greater difficulties in obtaining reliable data. Many cases come too late to derive any permanent benefit, others, after being much benefited, cease attending for various reasons, and are difficult to trace; but an experience lasting as long as the subject itself, and running into many hundreds of cases, leaves me thoroughly convinced that in the X rays we have a power over malignant disease that is capable of exerting a profound influence on our results. This power is much greater than it was even a few years ago and is still increasing; so much is this the case that we now obtain results scarcely hoped for a few years ago. This was well demonstrated in a series of cases shown by Mr. O. L. Addison and myself at the January meeting of the West London Medico-Chirurgical Society, and I think it may be said that those present received a lesson on the usefulness of the X rays in malignant disease that was somewhat of a revelation. The details of one of the cases shown may be given.

The patient was a man of 42 with a large mass in the abdomen about the size of a cocoanut. At the operation Mr. Addison found this to be a lympho-sarcoma with deposits in the stomach and liver and closed the incision without attempting removal. As soon as the patient was able to be about he came for X ray treatment, placing himself unreservedly in my hands. The mass rapidly diminished in size, digestion and health improved concurrently, he put on weight, and at the time of the meeting, seven months after the operation, he had been back to his work for some weeks and feeling quite well. Nothing could be then felt in the abdomen. He still comes for treatment, though not so frequently as before, and remains well at the present time. It is not suggested that this case is cured, but the result is a striking one nevertheless.

The other cases were scarcely less remarkable and all showed in the most unmistakable manner that in the modern developments of X ray technique we have a weapon of high value in our war against the scourge of malignant disease.

Regarding the closer coöperation between the surgeon and the radiologist in dealing with this problem I entirely endorse the plea contained in Mr. Grace's letter; as my writings will prove, I have been advocating this ever since 1903, and while there have been many discouragements I still hope to live to see the day it becomes the established practice. The partnership is one that holds nothing but good for all concerned, and no surgeon who has his patient's, and incidentally his own, interests at heart can afford to neglect this important aid to a permanently successful result, and

personally see that it is carried out. In the absence of facilities for raying at the time of operation the treatment should be commenced within a day or two—as soon as the patient has recovered from the anæsthetic and shock of operation. It is not necessary to disturb the dressings or the patient, as efficient treatment can be given at the bedside with a portable apparatus. Time is a most important factor for success, and we cannot afford to lose a single day's unnecessary delay. In the succeeding months further series of applications are given at gradually increasing intervals, with a diminishing number of applications in each series, and where this is carried out consistently it is rare to meet with local recurrence. More often secondary deposits arise in the spine or elsewhere, which is evidence of the case coming too late for operation or too late in being referred for radiation—perhaps both.

There is hardly any stage of malignant disease in which the X rays cannot be of some value. Inoperable cases are relieved of pain, and some of them through shrinkage, and becoming more movable, actually become operable, so that the case takes on a new aspect. Also the influence of modern X ray methods on a stinking, fungating, cancerous ulcer is such as would scarcely be believed by anyone who had not seen it for himself. I have caused such a mass to dry up completely, so that the last months were made reasonably comfortable and free from this most revolting feature.—I am, Sir, yours faithfully,

REGINALD MORTON,
Medical Officer in Charge, X Ray Department, West London Hospital.

Harley-street, W., March 12th, 1917.

THE FIRST SCHOOL FOR MOTHERS.

To the Editor of THE LANCET.

SIR,—In reference to Dr. E. Pritchard's letter in your issue of March 3rd it may be said at once that my claim should have been limited to the question of precedence between Winchester and St. Pancras. To any school founded before November, 1906, I offer my humble apologies, provided it has been conducted from the beginning on the lines of the French institutions to describe which the name "School for Mothers" was originally coined.

In Dr. W. J. Maloney's translation of Budin's "Nursling," published in 1907, the following references to *Consultations de Nourrissons* will be found. Professor Budin (p. 148) recalls how one of his pupils had "aptly" said "these consultations are really schools for mothers." In the same lecture he exhorts medical men, whether their lot be placed in town or village, to organise consultations for nurslings. Dr. H. de Rothschild called Professor Budin's consultation a school for mothers (p. xxii.). In his preface (p. vii.) Dr. Maloney has written:—

> Every practitioner, ... whether his sphere be large or small, can found a consultation for nurslings. There is nothing costly or complex in Professor Budin's methods. All that is necessary is an apparatus for sterilising milk, a balance, and the energy of a medical man.

Winchester, in November, 1906, provided the balance and the energy of a medical man to hold the consultations and raise the number of admissions to 102 and the attendances to 790 in the year 1908. The centre was therefore a consultation for nurslings and as such entitled to the description "School for Mothers," unless it can be shown that Dr. Maloney has misrepresented his teacher's views and methods, or that English methods and terminology were not in the first instance borrowed from France. There was no apparatus for sterilising milk, and if Winchester on that account is to be ruled out it will disappear in good company with St. Pancras. If not, then for the sake of historical accuracy Dr. Pritchard may safely amend his statement, "St. Pancras was not even the second," to read "St. Pancras was not even the third," since Winchester and Marylebone were both in the field at an earlier date.

Among the earlier centres of which I have first-hand knowledge the Finsbury Milk Depôt, provided by the Social Workers' Association, under the guidance and direction of Dr. (now Sir) George Newman, should be mentioned. The balance required by Dr. Maloney, sterilised or pasteurised milk controlled from its source at the farm, and infant consultations held by medical men, were provided at the depôt. It was not mentioned in my first letter because infants fed on the breast alone did not attend. I now find that the same somewhat serious defect existed at many of the French centres which Professor Budin has nevertheless referred to as consultations. Keeping, therefore, to the historical derivation of the title, the Finsbury Depôt should undoubtedly be ranked as a School for Mothers with priority from the date of its establishment on Nov. 23rd, 1904. In the "pioneer" (a loose term loosely defined in Webster's Dictionary) and "propaganda" work which has never been claimed for Winchester, Finsbury is well known to have played a part of the first importance.—I am, Sir, yours faithfully,

J. E. SANDILANDS.

Campden Hill-gardens, W., March 6th, 1917.

THE CLOSURE OF COLOTOMY OPENINGS.

To the Editor of THE LANCET.

SIR,—There is a simpler method of closing colotomy openings than either of those described by Mr. P. Lockhart-Mummery in your issue of March 10th.

The patient having been anæsthetised, a piece of sterilised oiled silk 10 inches square is laid over the gauze dressings covering the opening, and its inner vertical edge sutured to the skin of the abdomen, so as effectually to shut off the opening from the field of operation. The abdomen is then opened to the mesial side of the oiled silk by a vertical incision passing through the left rectus sheath. On inserting broad retractors, the posterior aspect of the anterior abdominal wall is well seen, together with the involved portion of the colon adherent to it. The proximal and distal limbs of this are divided between clamps, end-to-end anastomosis performed as described by Mr. Lockhart-Mummery in his second method, and the bowel dropped back into the abdomen. The involved portion of the colon thus cut off from the rest of the bowel is disposed of by the *method of invagination*. A stout silk ligature is placed around each stump and the clamps removed. For the first time during the operation the dressings are removed from the colotomy opening, and an assistant introduces through it the opened blades of a pile forceps and passes them into the proximal limb, guided by the surgeon; the latter invaginates the stump upon itself, pushing the ligatured end between the blades, which the assistant closes firmly. The assistant next introduces a second pair of forceps into the distal limb, and in like manner, aided by the surgeon, seizes its ligatured stump. He then withdraws the two pairs of forceps simultaneously from the colotomy opening, which has the effect of completely invaginating the involved portion of bowel and carrying it outside the abdomen. Viewed from inside by the surgeon, all there is to be seen is a dimple in the parietal peritoneum. The surgeon closes the abdominal wound without a drain, applies a dressing, flaps over the oiled silk, and while the assistant makes traction on the forceps, ligatures the base of the invaginated mass, which is then cut off. A separate dressing is applied and the oiled silk returned to its original position. The wound of operation heals by first intention, and the opening in the skin and abdominal wall where the colotomy was, by granulation.

The great advantages of this method are the rapidity with which it can be performed and the shutting out of the colotomy opening from the field of operation until the latter has been all but completed.

I am, Sir, yours faithfully,

PAUL BERNARD ROTH,
Late Specialist in Operative Surgery, Aldershot Command.

Harley-street, W., March 12th, 1917.

THE DIET OF THE BRAIN-WORKER.

To the Editor of THE LANCET.

SIR,—In support of the suggestion made in the annotation under the above heading in your issue of this date, that a brain-worker should take a diet of energy value equivalent to that of moderate muscular work, it may be of interest to record the following evidence on the subject. The late Field-Marshal Sir Lintorn Simmons, than whom a more painstaking and accurate observer never held rank in the British army, informed me some years ago that while he was governor of Woolwich Academy he kept notes of the amount of animal food consumed by the cadets, and found, to his surprise, that while they were under examination they consumed considerably more butcher's meat than at any other time in the academic year. The fact is the more remarkable in that during that period they were precluded in the main from taking outdoor exercise and from indulging in games and

field sports. When discussing the subject later Sir James Paget told me that his observations and personal experience fully confirmed Sir Lintorn Simmons's statement, adding that when on a holiday, spent largely in the air, he felt little or no need for animal food, but ate it with keen appetite when full work in London debarred him from outdoor exercise. All the information which I have been able to glean in my own sphere of work strengthens the conviction that mental concentration creates such an appetite for animal food as points to a physiological demand.

I am, Sir, yours faithfully,

Harley-street, W., March 10th, 1917. W. BEZLY THORNE.

THE AGE LIMITS OF PREGNANCY.

To the Editor of THE LANCET.

SIR,—I wish to establish, if possible, as a fact whether there is or is not a case of "a woman aged 48 or over having a living or viable child," recorded *on evidence other than the mere ipsa dixit* of the woman as to her age. Might I enlist the assistance of your readers to enable me to settle the point by reporting to me any cases within their knowledge. I am, of course, aware that there are a good many reported on the evidence of the mere statement of the woman that she was 48 or older; but as the Registration of Births Act is now over 50 years old it should be possible to get the date of parturition and the date of the mother's birth both officially recorded, and it is cases of this nature I am anxious to obtain for a forthcoming edition of "Taylor's Medical Jurisprudence." I am, Sir, yours faithfully,

138, Harley-street, W., March 1st, 1917. FRED. J. SMITH.

THE INTRAVENOUS INJECTION OF QUININE.

To the Editor of THE LANCET.

SIR,—With reference to the annotation on the above subject in your issue of March 3rd we should like to draw the attention of your readers to the advantages of colloidal quinine. Exhibited as a 1 per cent. "solution" the latter is on the alkaline side of neutrality and the temporary upset of injecting an acid solution either intravenously or intramuscularly is avoided. Furthermore—and this has been supported by laboratory experiment on animal veins—absorption of the quinine by osmosis and other mechanical factors into the tissues is much slower than in the case of molecular quinine solutions. We think it probable that the quinine in any case when injected must reach the colloidal state, and the statement of Dr. G. Arellano and his colleagues which you publish is of interest with regard to this when they say:—

> It has been observed at times, especially when time is lost in inserting the needle, that a kind of flocculent precipitate is formed similar to that of "aluvine" when injected intravenously; but, as in that case, experience has shown it to be perfectly safe, it being a sort of emulso-suspensoid.

The precipitate at first formed undoubtedly goes into colloidal solution, but in doing so there is always upset of complement (*in vitro*, complement is destroyed).

In the use of quinine internally as an antiseptic, recommended by Dr. Vincent J. Glover in the same issue, the delayed absorption and elimination and the consequent prolonged antiseptic action of colloidal quinine administered directly as such opens a field of considerable possibilities.

I am, Sir, yours faithfully,

J. F. WARD
(For Crookes' Collosols, Limited).

Elgin-crescent, W., March 6th, 1917.

STANDARDISED TUBERCULINS.—We have received from Messrs. Duncan, Flockhart, and Co., of Edinburgh, samples of tuberculin prepared by the Research Laboratory of the Royal College of Physicians of Edinburgh, under the personal direction of Professor J. Ritchie. These include old tuberculin (T.), human and bovine, new tuberculin (T.R.), and bacillary emulsion (B.E.), put up in sterilised glass capsules containing a definite quantity of the original material or of desiccated bacilli. For the convenience of hospitals and other public institutions undiluted tuberculins are also issued. The Research Committee may be congratulated on its enterprise.

The War.

THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue:—

Died.

Major S. D. Rowland, R.A.M.C., was educated at Berkhamsted and at Downing College, Cambridge, and was a student at St. Bartholomew's Hospital, London, qualifying in 1897. Joining the staff of the Lister Institute shortly afterwards, he later went to India to undertake work in connexion with the Plague Commission. On the outbreak of war he joined the R.A.M.C., and went to France in charge of No. 1 Mobile Laboratory. He died in France on March 6th.

Lieut.-Col. S. W. Hewetson, Canadian A.M.C., was a student at McGill University, and qualified in 1893.

Major H. Jones, Canadian Army Medical Corps.

Wounded.

Lieut. D. P. Thomas, R.A.M.C., attached Royal Field Artillery.

Capt. R. P. N. B. Benett, M.C., R.A.M.C.

Lieut. D. N. Fraser, R.A.M.C.

Lieut. A. Y. Dabgoekar, I.M.S.

Capt. G. W. Rogers, R.A.M.C., attached Lancashire Fusiliers.

Capt. E. A. Sanbrook, Australian A.M.C.

DEATHS AMONG THE SONS OF MEDICAL MEN.

The following son of a medical man must be added to our lists of those who have fallen during the war:—

Second Lieut. R. M. Ross, Worcestershire Regiment, youngest son of Dr. D. M. Ross, of Brighton.

THE HONOURS LIST.

The following awards to medical officers are announced:—

Bar to Military Cross.

Temp. Capt. Allen Coulter Hancock, M.C., R.A.M.C.

For conspicuous good work in advanced dressing-stations, notably when he successfully conducted evacuation of wounded under heavy shell-fire and adverse circumstances. Again, when the O.C. was wounded, Captain Hancock took command, and by his initiative, personal courage, and devotion to duty was responsible for the able carrying out of wounded through a barrage of shell-fire for six days. He was then severely gassed, but persisted in attempting duty until physically incapable.

(The award of the Military Cross was recorded in THE LANCET of Dec. 16th, 1916, p. 1034.)

Military Cross.

Temp. Lieut. George Cleverdon Hartley, R.A.M.C., attached East Surrey Regiment.

For conspicuous gallantry and devotion to duty. He displayed great courage and determination in assisting to rescue a wounded man from the open under very heavy fire.

FOREIGN DECORATIONS.

By the King of Serbia.

Order of St. Sava, Fifth Class.—Capt. R. P. Nash, R.A.M.C.

Order of St. Sava, Third Class.—Major H. St. M. Carter, D.S.O., R.A.M.C.

Distinguished Service Medal.—Temp. Capt. R. Heaton, R.A.M.C.

By the King of Montenegro.

Silver Medal for Bravery.—Temp. Capt. D. O. Riddell, D.S.O., R.A.M.C.

By the Sultan of Egypt.

Order of the Nile, Third Class.—Col. J. Fallon, A.M.S.

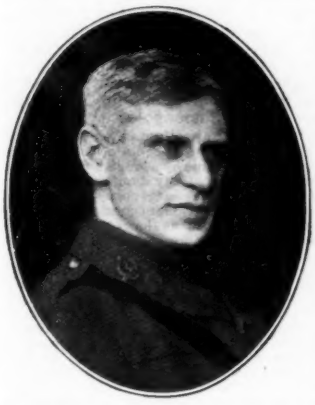
DOCTORS AND NATIONAL ORGANISATION.—At the monthly meeting of the Royal Faculty of Physicians and Surgeons of Glasgow held on March 5th the following resolution, moved by Dr. J. McGregor Robertson, and seconded by Dr. John Brown, was approved:—

That the Royal Faculty of Physicians and Surgeons of Glasgow approves of the principle of the organisation of the whole nation to secure the successful and rapid conclusion of the war, so that all fit persons shall be liable to be called on by the Government to render such service in naval, military, or civil departments as they may be deemed suitable for, due regard being paid to age, training, and circumstances; if and when this proposal is carried into actual practice by the Government the Royal Faculty will be prepared to render all possible assistance in the organisation of their own profession.

OBITUARY OF THE WAR.

JOSEPH ELLIS MILNE, M.A., M.D., C.M. ABERD., D.S.O.,
CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain J. E. Milne, who was killed in action in France on Feb. 22nd at the age of 48, was youngest son of Captain James Milne, a shipmaster, of Fraserburgh and Aberdeen. He was educated at Aberdeen Grammar School and University, taking his M.A. degree in 1888 and his M.B., C.M. with honours in 1891. Setting up in practice in Aberdeen, he remained there until April, 1915, when he applied for a commission in the R.A.M.C. Within a few days of obtaining it he sailed for France with the Highland Casualty Clearing Station, becoming later medical officer to the King's Liverpool Regiment. He had his aid-post in the front trench, having made special request that no wounded man should be removed from the place where he fell until he had seen him. And doubtless it was when thus engaged that Captain Milne received his own fatal injury.



Captain Milne was from his youth up a keen sportsman; in Aberdeen he was doctor to the Football Club; and in rest billets with his battalion he organised football teams. He was a shrewd observer of men, and never forgot a face he had once seen. Fearless himself, he was a strength to those he tended, whether in his exceptionally large practice at home or with the Irish lads at the front. In both spheres he leaves a blank. Captain Milne was unmarried.

THE LATE LIEUTENANT-COLONEL J. F. FLASHMAN, A.A.M.C.

Lieutenant-Colonel James Froude Flashman, whose death from pneumonia while on active service in France in his forty-seventh year we announced in an obituary notice last week, had for several years occupied the position of Government pathologist in the New South Wales Lunacy Department, lecturing on neurology at the University of Sydney. After leaving the Lunacy Department he practised in Sydney, where he held the appointments of honorary assistant physician and lecturer on clinical medicine at the Royal Prince Alfred Hospital and honorary physician to the South Sydney Hospital. At the outbreak of war he was Officer Commanding the University Scouts, and relinquished his command to join the Medical Corps for service abroad. Towards the end of last year he became a Member of the Royal College of Physicians of London. By his death Australia has lost a most promising member of the medical profession.

WAR DISABLEMENT.

Following their last statement and recommendations on the physical treatment of disabled soldiers, the Section of Balneology of the Royal Society of Medicine has now reappointed a War Disablement Committee to advise in all medical matters connected with the treatment and re-education of disabled soldiers. A demonstration of measuring apparatus was given at a meeting of the section on March 8th. Dr. R. Fortescue Fox said that it was fortunate for France that a leading part in the direction of the treatment of disabled men was in the hands of two physiologists, Professor Camus and Professor Amar, whose methods were widely followed in the centres for treatment and training throughout France. Dr. Fox showed a variety of instruments in use at the Red Cross Clinic for the Physical Treatment of Disabled Officers, including protractors and arthrometers from the Grand Palais Hospital, as well as Professor Amar's cheirograph for measuring and recording the feeble pressure of paralysed hands and his arthro-dynamometer. The exhibit also included goniometers and a torsion-meter for measuring supination and pronation, designed at the clinic. Dr. Sonntag, medical officer to the clinic, demonstrated an ergograph that he had designed for estimating and recording the power of muscular movements. All patients at the clinic are submitted to weekly measurements by one or more of these instruments. Dr. J. Campbell McClure communicated a paper by Mr. Roddie, who has charge of the manipulation baths at the clinic. The whole body may be treated by manipulation baths at about blood heat or single limbs at a much higher temperature (112° to 118° F.). The paper described the action and uses of such baths in increasing the mobility of muscles and joints and improving their nutrition.

THE EMERGENCY SURGICAL AID CORPS.

At the annual general meeting of this corps, held at the house of the Royal Society of Medicine, Sir Rickman Godlee presided over a good attendance of members. The organisation now consists of three corps, a Metropolitan Police section with 108 members, a military section (Home Forces) with 62 members, and a naval section, which has been formed since the last general meeting, with 12 chief surgeons, 43 surgeons, and 13 anæsthetists. Each section is equipped with an ample supply of all necessary surgical appliances packed in convenient boxes and has at its disposal, thanks to the Royal Automobile Club, a fleet of powerful motor-cars, while assistance is given by the General Omnibus Company and the Great Eastern Railway Company. The police section deals with any emergencies that may occur in the metropolis by reason of air raids or other risks to life in connexion with the war, the military section operates on the East Coast from Dover to the Wash, and the naval section is a reserve for assisting naval surgeons to deal with wounds brought into our ports at any point in the United Kingdom. In submitting the annual report Sir Rickman Godlee testified to the energy and labours of the executive committee, and stated that since the last meeting the rotas had been summoned 12 times, including the call to the scene of the explosion on Jan. 19th, when 103 members responded and 53 were sent to the scene of the disaster. The statement of income and expenditure showed that the receipts were £234 9*s.* 6*d.*, and the disbursements £253 14*s.* 5*d.*, and the chairman said that the executive committee would like to see the fund replenished and the deficit made good. Sir Arthur May, representing the Royal Navy, assured the corps of the great value which his department attached to it and the urgent need for its existence in case of necessity, although he hoped that necessity would never arise. Sir Thomas Gallwey, representing the Home Forces, said that but for the Emergency Corps he would not be able to state that the Home Forces were prepared for all contingencies, while Sir Edward Henry, representing the Metropolitan Police, in thanking the corps, said that it was very desirable that the public should know that air-raid relief-parties had been organised everywhere and that the cöoperation of the emergency corps ensured that even a catastrophe greater in magnitude than any yet experienced could, in respect to the aid of injured persons, be well and promptly dealt with. Some discussion on questions of detail in connexion with emergency work having taken place, the executive committee consisting of Sir Rickman Godlee, chairman, Captain F. F. Burghard, R.A.M.C. (T.F.), Mr. A. H. Cheatle, Mr. Ernest Clarke, Mr. W. H. Clayton-Greene, Mr. E. M. Corner, Major W. McA. Eccles, R.A.M.C. (T.F.), Mr. G. J. Jenkins, Dr. H. M. McCrea, Mr. M. S. Mayou, Mr. J. W. Thomson Walker, Dr. Andrew Wylie, and Mr. J. Y. W. MacAlister, honorary secretary, were re-elected, the name of Mr. J. P. Lockhart-Mummery being added to the list.

THE HARVARD MEDICAL UNIT.—Dr. Hugh Cabot and Dr. George P. Shattuck, of Boston, U.S.A., with 14 doctors and 17 nurses, arrived in London last week *en route* to France to reinforce the Harvard University Unit which has charge of one of our general hospitals. The unit is under the command of Sir Alan Perry, who met the new detachment. Dr. Cabot and Dr. Shattuck have already served a term at the hospital. It was rightly felt in the United States that to brave the perils of submarines was a fine action, and the unit had an enthusiastic send-off at Boston.

THE CONFERENCE SUMMONED BY MR. NEVILLE CHAMBERLAIN

The Conference summoned by Mr. Neville Chamberlain, the Director-General of National Service, to consider the organisation of the medical profession with a view to meeting the needs of the military and civil population in existing circumstances, was opened on March 14th. Sir Donald MacAlister, K.C.B., President of the General Medical Council, presided, and all the representatives summoned to the Conference were present—namely, Dr. T. Jenner Verrall, Mr. E. B. Turner, Dr. Bu'tar, Dr. Richmond, representing the Central Medical War Committee; Dr. Frederick Taylor and Sir Rickman Godlee, representing the Committee of Reference of the English Royal Colleges; and Dr. Norman Walker, Dr. J. C. McVail, and Dr. John Adams, representing the Scottish Medical Service Emergency Committee. The secretaries of these committees—namely, Dr. Cox and Mr. Bishop Harman, secretaries of the Central Medical War Committee, Mr. Hallett, secretary of the Committee of Reference, and Mr. T. H. Graham, secretary of the Scottish Medical Service Emergency Committee—were in attendance. The Conference was also attended by Sir William Babtie, V.C., representing the War Office; by Sir Arthur Newsholme and Mr. Stutchbury, representing the Local Government Board in England; and Sir Robert Morant and Mr. Smith Whitaker, representing the National Insurance Commission. The Conference did not conclude the important business brought before it and met again on March 15th. If the Conference should decide to advise the Director-General of National Service that compulsory powers must be obtained, there can, we think, be no doubt that legislation will be necessary. We believe that, from a preliminary survey of the position, the departments of the Government particularly interested have come to the conclusion that such legislation will be required.

ACCOMMODATION FOR THE WOUNDED AT PORTSMOUTH.—The Portsmouth board of guardians have prepared a scheme which will enable them to place 200 additional beds at the workhouse at the disposal of the war authorities. This will make about 600 beds which the board have provided for the wounded. They have also given consent for hospital tents to be put up in the grounds adjoining the present military blocks and for the erection of a shelter-hut on the roof of one of the wards. Any damage that may occur to the existing buildings is to be made good by the military authorities at the conclusion of hostilities.

VOCATIONAL RE-EDUCATION OF THE BELGIAN WAR CRIPPLE.—The Belgian Military Institute of Professional Re-education at Port-Villerz, near Vernon, combines facilities for medical treatment with a complete course of vocational re-education continued until the man is fully trained. Whilst in British institutions at the present time medical treatment rarely occupies more than an hour each day of the man's time, and his disabled part is re-educated for a small fraction only of the day, the training in the Belgian workshops ensures the movement of muscles and joints for several additional hours of the day. The cure of functional disability of limbs depends in large measure on the man's psychology, and the Belgian experience is that the interest of his work and the mental stimulus of seeing something made by his own efforts have appreciable value in his cure.

THE LATE DR. PATRICK W. MAXWELL.—The death occurred on Saturday, March 10th, at his residence in Dublin, of Dr. Patrick William Maxwell, one of the best-known ophthalmic surgeons in Ireland. He was only 61 years of age, but had been in unsatisfactory health for some time, and the death of his wife a year ago, and more recently that of his only son, who was killed in action, contributed to the sad end. Patrick Maxwell was a native of Glasgow and was educated at Edinburgh University, where he took the M.B. and M.C. degrees in 1880. After spending some time abroad he settled in Dublin, obtained the Fellowship of the Royal College of Surgeons in Ireland, and held various hospital appointments. He was aural and ophthalmic surgeon to Dr. Steevens' Hospital, Jervis Street Hospital, and to the Royal Victoria Eye and Ear Hospital, and surgeon-aurist in ordinary to the Lord Lieutenant during the vice-royalty of Lord Zetland. Of the three daughters who survive him one, Miss E. M. Maxwell, is a member of the medical profession, and is at present engaged in ophthalmic work at Malta.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

Cocaine in Dentistry.

THE Committee appointed by the Home Secretary to inquire into the use of cocaine in dentistry has reported, and the report is signed by Sir CHARLES HOBHOUSE and three of the four remaining members. The inquiry took its rise in certain opposition which developed to the terms of a regulation under the Defence of the Realm Act forbidding the sale of cocaine to, or its possession by, any except authorised persons. This interfered with the supply of the drug to unregistered dental practitioners, and pending the completion of inquiry, temporary relaxation of the regulation was granted to them in the form of permits. The Committee has now come to the following conclusions:—

We are of opinion that while there is practically no evidence to show any prevalence of the cocaine habit amongst the people of this country, and only one case of the improper use of cocaine by unregistered dentists, yet, as a drug, it is so uncertain and so potentially dangerous in its uncertainty that some restriction should be placed on its possession and sale. Accordingly, we recommend: (a) That preparations of cocaine containing more than 1 per cent. of cocaine for use as local anæsthetics in connexion with dental work should be procurable only from registered chemists, or from persons or firms licensed for the purpose by the Home Secretary, and subject to the condition that such preparations should be used for dental purposes only. (b) That such preparations should only be procurable for use by registered dentists or members of a dental association, the conditions of membership of which have been approved by the Home Secretary. The above-mentioned classes will naturally be free to purchase all preparations not exceeding 1 per cent. strength. (c) That persons practising *bona fide* as unregistered dental practitioners, and who can so satisfy their local authority, should be entitled to apply for registration, for right to purchase preparations of cocaine containing not more than 1 per cent. of cocaine: Such authorisation to be granted by the county or borough council of the locality in which their business is situated, any refusal to register such persons being subjected to an appeal to the Home Secretary.

Professor W. M. BAYLISS is the member of the Committee who does not sign the report.

"The conclusion," he says in the course of a memorandum, "to which the evidence compels me to come is that, since the sale of cocaine is attended with serious risks to the community and is unnecessary in dentistry, there is no reason to interfere with the operation of Regulation 40 B of the Defence of the Realm Regulations, and I would venture to recommend that the permit which has been issued to unregistered dentists to obtain preparations of cocaine should not be continued for any further period of time.

Criminal Law Amendment Bill.

Further consideration has been given to the terms of Clause 2 of the Criminal Law Amendment Bill by a Grand Committee of the House of Commons. The clause prohibits sexual intercourse by a person suffering from venereal disease in a communicable form.

On Thursday, March 8th, Mr. GLYN-JONES moved an amendment so that the offence of soliciting or inviting by a person suffering from venereal disease should not extend to instances where the parties were husband and wife. Sir GEORGE CAVE, the Home Secretary, deprecated introducing an exception into the general language of the clause. The amendment was withdrawn.

Mr. RAWLINSON moved an amendment to the effect that a person suffering from the disease—

Shall forthwith consult a duly qualified medical practitioner either at a hospital or otherwise, and shall take reasonable precautions to prevent the communication of such disease to other people.

He said that Lord Rhondda's Bill had now been introduced in the House of Lords, but it only provided that unqualified persons should not practise as regarded venereal disease. There was not a word in that Bill requiring infected people to consult a medical man. Therefore it would be well to deal with the matter in the Bill before them. People should be persuaded at once to consult a physician.

Mr. HAYES FISHER (Parliamentary Secretary to the Local Government Board), whilst hoping that the amendment would not be pressed, agreed that it was most desirable that a duly qualified medical man should be promptly consulted. That, indeed, was the whole policy of the Local Government Board, and arrangements were being made all over the country that proper treatment could be obtained gratuitously and secretly. That was being done on a purely voluntary basis. By this inducement it was hoped greatly to mitigate the disease. But the policy was one of inducement and not of punishment. If failure to consult a duly qualified medical practitioner was made a criminal offence, that would stifle the policy of the Local Government Board at once. It would be unwise to invoke too many penalties.

Sir W. COLLINS referred to the scope of Lord Rhondda's Bill and expressed disappointment at its limited character. He did not find in it any of the sanitary precautions with which it had been expected the Bill would deal. As to the amendment, he favoured education and not punishment.

After some discussion the amendment was rejected without a division.

It having been agreed that from Clause 2 there should be omitted Subsection 3, providing for the compulsory examination of persons convicted of certain offences, on Wednesday, March 14th, the Committee, acting on an amendment moved by Commander WEDGWOOD, omitted also Subsection 4, the force of which, it was admitted by the Home Secretary, had now disappeared. Sir WILLIAM COLLINS moved as an amendment to insert—

> Every medical practitioner on becoming aware that any patient of his is suffering from venereal disease in a communicable form shall forthwith inform him thereof, and warn him against any action or neglect on his part which might render likely the communication of such disease to any other person.

The amendment had been put down on the assumption that Subsections 3 and 4 were to be kept in the Bill, and after some debate was withdrawn. A discussion took place on a proposal to insert in the clause a subsection securing the detention of a person convicted of an offence in the schedule to the Act, and certified to be suffering from venereal disease, until the disease may be no longer communicable. The Home Secretary opposed the suggestion, which was rejected. In Subsection 6 of Clause 2 the following definition of venereal disease was agreed upon: "Syphilis, gonorrhœa or soft chancre," necessary additions to the list, if any, to be made by statute.

HOUSE OF LORDS.

THURSDAY, MARCH 8TH.

Venereal Disease Bill.

Lord RHONDDA (President of the Local Government Board) moved the second reading of the Venereal Disease Bill, the purpose of which is to prevent the treatment of venereal disease otherwise than by duly qualified medical practitioners and to control the supply of remedies therefor. He said that it was hoped that the measure would very considerably reduce the ravages of venereal disease. He did not propose to emphasise in any detail the widespread character of the evil or the fell consequences of this terrible scourge on the health of the nation. At the same time he wished to guard himself against any suggestion that because of the unpleasant nature of the subject with which the Bill dealt it ought not to be discussed. On the contrary, he thought that the National Council for the Prevention of Venereal Disease were doing valuable work in trying to bring home to the people of this country the terrible consequences of this contagion. It was most important that all should be taught to shun any possibility of contagion just as they would shun deadly poison. The Bill was based mainly on the conclusions of the Royal Commission which reported last year, and the conclusions of that body must carry greater force than anything he could say on this subject. The Commission had not been able to arrive at exact figures, but the evidence led it to the conclusion that the number of persons affected with syphilis, acquired or congenital, could not fall below 10 per cent. of the population in large cities. Gonorrhœa must exceed that proportion. In connexion with the Royal Commission, all would be indebted to Lord Sydenham, the chairman, for the work he had done, and he would heartily welcome any assistance which he would be good enough to give in the passage of the Bill into law. If precise and definite figures regarding the disease existed they would not be a full measure of the very great evil. The reason why figures were not available was that there were a number of deaths arising from this cause which were not detected as such, or they were otherwise certified in order to avoid wounding the susceptibilities of relatives. Deaths due to general paralysis of the insane were mainly to be attributed to venereal disease. It was often a cause in locomotor ataxy and aneurysm of the aorta. Congenital debility in infants was often due to syphilis in the parents. It predisposed very largely to tuberculosis. In the case of cancer it often happened that the disease was started in an old sore. The evidence before the Royal Commission showed that it was the cause even of the death of children before their birth. It was estimated that a large percentage of sterility in women was due to gonorrhœa, and a common cause of the blindness in children was venereal disease of the parents. That amply proved the need for remedial measures.

Urgency of Legislation.

The urgency (Lord Rhondda proceeded) would be great at any time, but it was greater now when the nation was at war. History recorded this fact over several centuries that after every great war there was a great increase in the disease. The noble lord proceeded to quote from Sir Malcolm Morris to the effect that the great strides in medical knowledge during the last 10 years gave more hope and encouragement that something substantial could be done in mitigating the evil. He referred also to the discovery of salvarsan by Ehrlich. The disease could be brought under control, and might now be regarded as curable if treated in the early stages. The Local Government Board had been in communication with the county councils and county borough councils and had invited them to prepare schemes of diagnosis and treatment in coöperation with hospitals and general practitioners. It had arranged for elaborate facilities for diagnosis, hospital treatment, treatment to all comers irrespective of residence, free and confidential, and for the free supply of drugs to general practitioners. The county councils were asked to provide 25 per cent. of the cost, and the Treasury had agreed to contribute 75 per cent. The present Bill was a corollary to the treatment in these centres already being arranged by the local authorities.

Prevention of Quack Treatment.

The Bill was designed to prevent quack treatment of the disease. It prohibited treatment by unqualified persons, and also the sale or supply of any drug in this connexion except on the written prescription of a duly qualified practitioner. Clause 2 provided means for the Act being brought into operation in an area when the local authorities had provided for free diagnosis and free treatment. The Bill went rather beyond the actual recommendations made by the Royal Commission. The Commission did not actually recommend the suppression of unqualified persons, but it reported that the members had no hesitation in stating that the effects of unqualified practice were disastrous, and its continued existence was one of the principal causes in hindering the eradication of venereal diseases. He had had conversation with several members of the Commission, and he thought that they would have gone further in some of their recommendations to-day. The Commission had had regard to some practical difficulties, but some of these had been removed. He did not claim that the Bill was watertight, and it was possible that some of its provisions might be evaded by unscrupulous persons. On the other hand, it marked a very considerable advance and the moral effect should be great. Their lordships might wish to know how far the schemes of treatment and diagnosis had been carried out. Schemes prepared by county councils and borough councils had been submitted for districts covering in England and Wales a population of 23½ millions out of a total population of 36 millions. Of these, schemes covering a population of 16 millions had been provided. In half the country, therefore, there was provision for free diagnosis and treatment. The practical difficulties which the Commission had in mind had been removed.

An Uncontroversial Measure.

The Bill (Lord Rhondda hoped) would be regarded as an uncontroversial measure. No doubt it would press a little hardly on druggists and chemists, but he had every confidence in believing that the pharmaceutical body as a whole would offer practically no opposition to the measure. It would, no doubt, interfere to some extent with the livelihood of herbalists, but after hearing from a deputation what they had to say he saw no reason to change his view that he ought to stand firmly for having no exception made with regard to them. Their Lordships might consider the Bill rather a mild measure for so great an evil, and he apprehended that any criticism which they might make would be towards the omissions in the Bill rather than on what it contained. There was a considerable body of opinion in the country which favoured compulsory notification. He approached that point with a perfectly open mind. He gave it every possible unprejudiced consideration, and he came to the conclusion that the Bill was not closing the door to some modified form of compulsory notification later on. For the present Parliament should give a fair trial to the action which was being taken by the local authorities, and it would prejudice that fair trial if compulsory notification were introduced now. Compulsory notification might endanger the new scheme of treatment, as it would encourage persons to conceal the presence of the disease. He hoped that after the Bill passed through the House of Lords it would be sent by the House of Commons for consideration to the Grand Committee which was considering the Criminal Law Amendment Bill.

Lord SYDENHAM, as Chairman of the Royal Commission on Venereal Disease, welcomed the Bill. There was abundant evidence brought before the Commission to prove that the treatment of venereal diseases by quacks and by quack remedies had been disastrous in the extreme. It was vitally important that these diseases should be treated in the very earliest stages. The noble lord drew attention at some length to the evils arising from quack remedies and quack treatment. The Commission was impressed with the evils of unqualified practice, but it did not like at the time when it reported to recommend legislation for the suppression of quacks, feeling that that ought to come when free and ample treatment was made for all classes. The Bill was a considerable step in advance.

Lord GAINFORD, speaking from his experience as President of the Board of Education (an office which, as Mr. J. A. Pease, he held before his elevation to the peerage), referred to the tragic sufferings which many children endured as the result of venereal disease in their parents.

The Bill was read a second time.

The Venereal Disease Bill passed through Committee on Tuesday, March 13th, without amendment or comment.

HOUSE OF COMMONS.

WEDNESDAY, MARCH 7TH.

Nurses' Registration.

Mr. MACCALLUM SCOTT asked the Parliamentary Secretary to the Local Government Board whether, before any Bill for the State Registration of Trained Nurses was introduced, an opportunity would be given to the organised societies of nurses in England, Scotland, and Ireland to make representations to the Government.—Mr. HAYES FISHER replied: Full consideration will be given to any representations made by organised societies of nurses before the Government introduces any Bill for the State registration of nurses.

Mr. DUNDAS WHITE: Will they be given an opportunity of presenting their views personally by deputation?—Mr. HAYES FISHER: I will consider that.

Mr. RENDALL: Is it the intention of the Government to introduce a Bill of this kind?—Mr. HAYES FISHER: That is a matter that is still undergoing consideration.

THURSDAY, MARCH 8TH.

Treatment of Disabled Soldiers in Scotland.

Answering Mr. DUNCAN MILLAR, Mr. BARNES (Minister of Pensions) said: When I discussed the whole subject of the treatment and training of disabled soldiers at a conference of the Provosts of Scottish towns at Glasgow recently, it was arranged that the matter should be considered for Scotland as a whole by them. In the meantime various proposals had been made by local committees. Among these we may mention the provision of a hospital for cases of paralysis at Ralston House, near Glasgow, and the use of the Hairmires Colony, near Lanark, for tuberculous cases. In Edinburgh the Royal Colleges of Physicians and Surgeons have undertaken the medical examination of cases for the local committees, and a joint committee of the Colleges is now considering arrangements for the medical treatment of discharged men. I am taking steps to arrange a conference of local committees with the object of securing the acceptance of a scheme for the whole of Scotland.

MONDAY, MARCH 12TH.

Free Treatment of Venereal Diseases.

In reply to Mr. ROWNTREE, Mr. HAYES FISHER, Parliamentary Secretary to the Local Government Board, wrote: Twenty local authorities in England have already provided facilities for the free treatment of venereal diseases in 28 hospitals. These facilities are also available for the treatment of persons residing in other areas. The Local Government Board has approved the schemes of 24 other authorities for the provision of free treatment, and the facilities afforded by these schemes will be available shortly. In addition, the Board has under consideration further schemes submitted by 44 local authorities. It is not yet possible to supply any statistics as to the number of persons who are applying for treatment at the hospitals where facilities are already available.

Infant Mortality.

Answering Mr. W. THORNE, who asked for statistics as to infant mortality in certain borough areas, Mr. HAYES FISHER wrote: The figures are:—

—	Deaths of infants under 1 year per 1000 births.			—	Deaths of infants under 1 year per 1000 births.		
	1914	1915	1916		1914	1915	1916
Battersea ...	94	113	84	Liverpool ...	140	133	116
Lambeth ...	104	105	89	Manchester ...	129	128	109
Woolwich ...	85	94	68	Newcastle-on-Tyne	137	134	122
Birmingham	122	118	103	St. Helens ...	139	128	108
Blackburn ...	116	146	119	Sheffield ...	132	133	109
Bradford ...	122	123	119				
Burnley ...	158	166	151				
Coventry ...	86	86	88	Mean rate in the 14 areas	126	125	109
Leeds	124	127	126				

TUESDAY, MARCH 13TH.

Medical Classification of Attested Men.

Replying to Mr. MACCALLUM SCOTT, who asked whether any decision had yet been reached as to the new instructions with regard to attested men rejected on re-examination and as to the new form of medical classification certificate, Mr. MACPHERSON (Under Secretary for War) said: It is intended to modify the present instructions and to issue a new form of medical classification certificate, but the new form and instructions have not yet been issued.

Medical News.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—An ordinary meeting of the Council was held on March 8th, Sir W. Watson Cheyne, the President, being in the chair. A report was read from Mr. H. C. Golding-Bird on the proceedings of the Central Midwives Board during the past year. The Council placed on record their high appreciation of Mr. Golding-Bird's services as the representative of the College on the Central Midwives Board, and directed that the grateful thanks of the Council be conveyed to him for the very efficient manner in which he has fulfilled the duties associated with that office during the last eight years. Mr. H. J. Waring was elected as the representative of the College on the General Medical Council in the vacancy occasioned by the retirement of Sir Henry Morris. The Council resolved that they should place on record their great appreciation of the services of Sir Henry Morris in acting as the representative of the College on the General Medical Council for 13 years. The President reported the delivery of the Hunterian Oration by Surgeon-General Sir George H. Makins, K.C.M.G., A.M.S. The best thanks of the Council were given to Sir George Makins for his oration, and he was requested to publish it. In response to a request from the secretary of the National Medical Union, it was resolved that the President should receive a deputation from that body to confer with him on the subject of the mobilisation of the medical profession.—Licences to practise dentistry were conferred upon 11 candidates (including one woman), who have passed the necessary examinations and have complied with the by-laws. The following are the names and dental schools of the successful candidates:—

Cyril Charles Becker, Guy's Hospital; Eric Bottomley, Leeds University; George Harold Danks, Guy's Hospital; Thomas John Davies, London Hospital; Francis Malcolm Timothy Flintan, Middlesex and Royal Dental Hospitals; Florence Goodman, University College Hospital; Clifford Morley John, Bristol University; Aubrey Thompson Madin, Birmingham University; David Errand Robinson, Guy's Hospital; Alfred Williams, Bristol University; and Robert Wolff, B.Sc. Cape Town, Middlesex and Royal Dental Hospitals.

UNIVERSITY OF BRISTOL.—At the Second Examination for the degrees of M.B., Ch.B., the following candidates were successful:—

Hilda Mary Brown, Sukhasagar Datta, Marjorie Smith Neville, and Thomas Henry Algernon Pinniger.

At the Third Examination for the Diploma in Dental Surgery William Holder Shipway was successful.

THE Wellcome Historical Medical Museum will be closed from April 1st to the 30th, inclusive, for cleaning.

Mr. Leslie Pearce Gould, M.A., M.Ch. Oxford, F.R.C.S. Eng., has been elected Radcliffe Travelling Fellow at Oxford for 1917–20. He is the son of Sir Alfred Pearce Gould.

THE honorary treasurer of Queen Mary's Convalescent Auxiliary Hospitals, Roehampton, has received £1000 from the Executive Committee of the Saskatchewan branch of the Canadian Red Cross Society for a year's maintenance of a ward in these hospitals.

ROYAL MICROSCOPICAL SOCIETY.—The next meeting of this society will be held on Wednesday, March 21st, at 8 P.M., when Mr. Kenneth Goadby will communicate "Bacteriology of War Wounds."

CHARITY ORGANISATION SOCIETY.—The third of a series of lectures on social subjects will be held at 34, Queen Anne's Gate, S.W., by invitation of Lady Glenconner, on Wednesday next, March 21st, at 3.30 P.M. Dr. F. N. K. Menzies, Principal Assistant Medical Officer to the London County Council, will give an address on the Prevention of Consumption.

THE LATE ROBERT ROXBURGH, M.B. EDIN., F.R.C.S. EDIN., J.P.—Dr. Robert Roxburgh, who died at his residence at Weston-super-Mare, on Feb. 16th, graduated as M.B. Edin. in 1876, taking the F.R.C.S. Edin. in 1880. He had practised in Weston for many years, and was honorary physician to the Weston-super-Mare Hospital and consulting physician to the Royal West of England Sanatorium. He was held in high esteem in Weston, and his efforts in promoting every good public and sanitary work in that town will be gratefully remembered by his numerous friends and patients.

MEDICAL WOMEN'S FEDERATION.—The first general meeting of the Medical Women's Federation will be held at the rooms of the Medical Society of London, 11, Chandos-street, Cavendish-square, W., on Friday next, March 23rd, at 3 P.M. At this meeting a statement will be made as to the

history, aims, and objects of the Federation, after which the following resolution will be discussed and then put to the meeting:—

That this meeting heartily approves of the Medical Women's Federation and pledges itself to support it by every means within its power.

The election of officers will follow. Dr. Jane Walker is acting as honorary secretary *pro tem.* to the Federation.

THE PROFESSORSHIP OF CHEMISTRY IN QUEEN'S UNIVERSITY, BELFAST.—The Chair of Chemistry in the Queen's University of Belfast has become vacant through the resignation, owing to declining health, of Dr. E. A. Letts, who has held the position since 1879.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

HINE, ALFRED ERNEST BARRATT, L.R.C.P., M.R.C.S., D.P.H., has been appointed Medical Officer to the Rhode Hill V.A.D. Hospital, Uplyme, Devon.

KIRKMAN, ALBERT HENRY BEAUMONT, F.R.C.S. Edin., M.R.C.S., L.R.C.P., Medical Officer and Public Vaccinator for the Axmouth District by the Axminster (Devon) Board of Guardians.

LISTER, T. D., M.D., B.S. Lond., Consultant for Chest Cases to the Prince of Wales's Hospital for Officers, Marylebone-road, W. (Great Central Hotel).

NEWLAND, F. C., Certifying Surgeon under the Factory and Workshop Acts for the Cleobury Mortimer District of the county of Salop.

PRIDHAM, W. F., M.R.C.S., L.R.C.P., L.S.A., Medical Officer of Health for Great Torrington (Devon).

RAMSDEN-WOOD, WILLIAM EDWARD, M.A., M.D. Cantab., F.R.C.S., M.R.C.P. Edin., Representative on the Devon Voluntary Association for the Care of the Mentally Defective.

ROY, D. W., M.B., B.C. Cantab., F.R.C.S. Eng., Physician to Out-patients at the General Lying-in Hospital, York-road, Lambeth, S.E.

SQUIRE, J. E., F.R.C.P., and WHITE, W. H., F.R.C.P., Consulting Physicians to the Marylebone General Dispensary.

WEBB, C. H. S., M.B., B.S. Lond., Assistant Surgeon to the Middlesex Hospital.

WILLIAMS, SYDNEY RICE, M.B. Lond., L.R.C.P., M.R.C.S., Temporary Medical Officer of Health for the Ashburton (Devon) District Council.

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).
When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

BIRKENHEAD UNION INFIRMARY.—Junior Female Resident Assistant Medical Officer. Salary at the rate of £300 per annum, with board, &c.

BIRMINGHAM GENERAL DISPENSARY.—Resident Medical Officer, unmarried. Salary £250 per annum, with apartments, &c.

BIRMINGHAM AND MIDLAND EYE HOSPITAL.—Female House Surgeon. Salary £200 per annum.

BOLTON UNION, FISHPOOL INSTITUTION, Farnworth, near Bolton.—Resident Assistant Medical Officer. Salary £383 5*s.* per annum, with rations, &c.

BRISTOL ROYAL INFIRMARY.—House Physician and House Surgeon. Salary at rate of £120 per annum, with board, &c.

BURY INFIRMARY.—Junior House Surgeon. Salary £150 per annum, with board, &c.

CAMBRIDGE, COUNTY MENTAL HOSPITAL.—First Assistant Medical Officer. Also Junior (Second) Assistant Medical Officer, unmarried. Salaries £300 and £200 respectively, with board, &c.

CARLISLE, CUMBERLAND INFIRMARY.—House Surgeon. Salary £200 per annum, with board, &c.

COLCHESTER, ESSEX COUNTY HOSPITAL.—Female House Surgeons.

DEVONPORT, ROYAL ALBERT HOSPITAL.—Assistant House Surgeon, unmarried. Salary £150 per annum, with board, &c.

EVELINA HOSPITAL FOR SICK CHILDREN, Southwark, S.E.—Clinical Assistants in Out-patient Departments.

GRIMSBY COUNTY BOROUGH.—Temporary Female Assistant Medical Officer. Salary £350 per annum.

GUILDFORD, ROYAL SURREY COUNTY HOSPITAL.—House Surgeon. Salary £250 per annum, with board, &c.

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton.—House Physician for six months. Salary 30 guineas.

IPSWICH, EAST SUFFOLK AND IPSWICH HOSPITAL.—Female Resident Officer.

KENSINGTON AND FULHAM GENERAL HOSPITAL, Earl's Court, S.W.—Resident Medical Officer. Salary £150 per annum.

KENT EDUCATION COMMITTEE.—Ophthalmic Surgeon.

LIVERPOOL, DAVID LEWIS NORTHERN HOSPITAL.—House Surgeon for six months. Salary at the rate of £150 per annum, with board, &c.

LIVERPOOL, ROYAL SOUTHERN HOSPITAL.—Two House Surgeons for six months.

LONDON THROAT HOSPITAL, 204, Great Portland-street, W.—House Surgeon. Salary £50 per annum.

MANCHESTER, BAGULEY SANATORIUM FOR TUBERCULOSIS.—First Assistant Medical Officer, unmarried. Salary £300 per annum, with board, &c.

MANCHESTER CORPORATION.—Assistant Tuberculosis Officer. Salary £350 per annum.

MANCHESTER NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, Park-place, Cheetham Hill-road.—House Surgeon. Salary £120 per annum, with board, &c.

METROPOLITAN HOSPITAL, Kingsland-road, E.—Temporary Medical Officer for the Tuberculosis Dispensary.

NORWICH, NORFOLK AND NORWICH HOSPITAL.—Two House Surgeons. Salary £400 per annum, with board, &c.

OLDHAM ROYAL INFIRMARY.—First House Surgeon. Salary £250 per annum. Also Second House Surgeon. Salary £250 per annum. Also Third House Surgeon. Salary £200 per annum. With board, &c.

PETERBOROUGH INFIRMARY.—House Surgeon. Salary £150 per annum for first six months, £200 after, with board, &c.

PLAISTOW FEVER HOSPITAL, E.—Female Resident Medical Officer. Salary at rate of £250 per annum, all found.

QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, Bethnal Green, E.—House Surgeon and Casualty House Surgeon for six months. Salary £120 per annum, with board, &c.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford.—House Surgeon.

READING, ROYAL BERKSHIRE HOSPITAL.—House Surgeon for six months. Salary £250 per annum, with board, &c.

ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.—Female Senior Obstetric Assistant. Salary £33 per annum, with board, &c. Also to attend at Endsleigh-street Maternity Hospital. Salary £60 per annum.

ROYAL WATERLOO HOSPITAL FOR CHILDREN AND WOMEN, S.E.—Temporary Honorary Assistant Physician.

SALFORD ROYAL HOSPITAL.—Junior House Surgeon. Salary at rate of £150 per annum, with board, &c.

SHEFFIELD ROYAL INFIRMARY.—House Physician. Salary £120 per annum, with board, &c.

SHREWSBURY, SHIRLEIT SANATORIUM.—Temporary Assistant Officer. Salary £300 per annum, with board, &c.

SOUTHAMPTON, ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL.—House Physician and Junior House Surgeon. Salaries £150 and £120 per annum respectively, with board, &c.

TRURO, ROYAL CORNWALL INFIRMARY.—House Surgeon. Salary £150 per annum, with board, &c.

WARRINGTON INFIRMARY AND DISPENSARY.—Senior and Junior House Surgeons. Salary £200 and £150 per annum respectively, with board, &c.

WILTS COUNTY COUNCIL GENERAL EDUCATION COMMITTEE.—Dental Surgeon. Salary £250 per annum.

WINCHESTER, ROYAL HAMPSHIRE COUNTY HOSPITAL.—Resident Medical Officer. Salary £300 per annum, with board, &c.

WOLVERHAMPTON AND STAFFORDSHIRE GENERAL HOSPITAL.—Resident Medical Officer or House Surgeon. Salary at rate of £150 per annum, with board, &c.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Glyn-neath (Glamorgan); and at Gravesend (Kent).

Births, Marriages, and Deaths.

BIRTHS.

DOWNS.—On March 12th, at Palmers, Marlow-on-Thames, the wife of Dr. G. E. Downs, of a son.

EVANS.—On March 7th, Dorothy, wife of Arthur Evans, M.S., F.R.C.S., of Devonshire-place, W., of a son.

TATTERSALL.—On March 6th, at Beachy, Neath, South Wales, to Marnie and Captain Norman Tattersall, R.A.M.C.—a son.

WHELDON.—On March 3rd, at Abbeville-road, Clapham Park, S.W., to the wife of George Wheldon, L.D.S., Temporary Lieutenant, R.A.M.C.—a son.

MARRIAGES.

BROOME—HARVEY.—On March 6th, at Brading Parish Church, I.W., Frederick Charles Sedgwick Broome, Surgeon, R.N., to Mona Kathleen, youngest daughter of Mr. and Mrs. John Ginnes Harvey, Brading.

CARTE—FOSTER.—On March 8th, at Holy Trinity Church, Cambridge, Geoffrey W. Carte, Surgeon, R.N., to Georgina, daughter of Captain Michael Foster, M.D., F.R.C.P.

FARNFIELD—WINDSOR-WATSON.—On March 7th, at All Souls', Hastings, John Stewart Farnfield, M.R.C.S., L.R.C.P. Lond., to Annabel Windsor-Watson, widow of John Watson, solicitor, Liverpool.

LEWIS—MANSFIELD.—On March 3rd, at St Saviour's Church, London, Lieutenant-Colonel Rowland Philip Lewis, R.A.M.C., Wales, to Muriel Mary, only daughter of the late Edmund C. Mansfield, Ardrummon House, co. Donegal.

STRATON—ROBERTSON.—On March 7th, at St. Matthew's Church, Ealing, Arthur Arbuthnot Straton, M.D., F.R.C.S., Temp. Captain, R.A.M.C., to Mabel, third daughter of Mr. and Mrs. James Robertson, of Warwick-road, Ealing.

DEATHS.

BEATLEY.—At St. Mary's terrace, Newcastle-on-Tyne, William Crump Beatley, M.D., in his 61st year.

INMAN.—On March 11th, at Bournemouth, of heart failure, resulting from an acute pneumococcal infection, Dorothy Marguerite, beloved wife of A. C. Inman, M.A., M.B. Oxon., Superintendent of Laboratories, Brompton Hospital, London, Temp. Hon. Capt. R.A.M.C., and only child of Dr. and Mrs. Wethered, of 83, Harley-street, London.

MURDOCH.—On March 9th, at Fruids Park, Annan, Dumfriesshire, William Murdoch, M.D. Edin., aged 62 years.

RAWES.—On March 6th, at a nursing home in London, William Rawes, F.R.C.S. Eng., M.D. Durh., of St. Luke's Hospital, City-road, aged 55 years.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

ICELAND MOSS.

A GERMAN professor has recently suggested using Iceland moss for mixing with flour to make bread. The following account of the use of this substance will be found in "A History of the Vegetable Kingdom" (1857), by William Rhind, then lecturer on botany, Marischal College, Aberdeen:—

> Iceland moss (*Lichen islandicus*) is used as an edible substance by the Icelanders, who rarely obtain corn bread, and whose limited stock of substitutes obliges them to have recourse to every species of vegetable production, which is permitted by their inclement climate to spring forth. The plant is collected by the inhabitants of this northern region; and after being washed, is either cut into pieces, or it is dried by the fire or in the sun, then put into a bag which is well beaten. It is ultimately worked into a powder by being trampled on, and in this state is used as food. This lichen is found growing on the mountains both in the lowlands and highlands of Scotland. It consists of upright leaves nearly 2 inches high; soft and pliant when moist, but rigid when dry. They are smooth and shining, inclining to a red colour towards the roots, and having the exterior surface sprinkled with very minute black warts. The margins are set with small short stiff sporules. This lichen contains a nutritious matter called lichen-starch, along with a bitter principle. It is demulcent and tonic. When boiled and macerated in water it forms a nutritious and light jelly, which, with the addition of sugar and milk, has been used as a dietetic medicine in cases of decline, and was fancied at one time as a cure for consumption.

The name is now *Cetraria islandica*. In Germany it is said to be used for dressing the warp of webs in the loom. The jelly has also been mixed with wine as a nutrient drink. The moss is now said to contain cetrarin 3 per cent., lichenin 45 per cent., amylaceous fibrin 36 per cent., gum 4 per cent., non-crystallisable sugar 4 per cent., water and salts (inorganic) 8 per cent. Lichenin is a starch-like body. The component parts, according to the analysis of Berzelius, are as follows: Bitter extractive 3·0, lichen starch 44·6, sugar 3·6, gum 3·7, yellow extractive 7·0, green wax 1·6, tartar, tartrate of lime, and a little phosphate of lime 1·9, starchy fibre 36·2, trace of gallic acid. Dr. Spencer Thomson in 1852 said that—

> It has been estimated that a ton of Iceland moss contains about as much nutritive matter as half a ton of wheat. The Saxon Government published a report upon this subject a few years ago, in which we are informed that 6 pounds 11 ounces of lichen meal, boiled with 14 times its quantity of water, and baked in this state with 39½ pounds of flour, produced 111½ pounds of good household bread. Without this addition the flour would not have produced more than 78½ pounds of bread, consequently the addition of 6 pounds 11 ounces of lichen meal occasioned an increase of above 32 pounds of good bread.

This increase was owing, of course, to additional water.

The use of the moss in phthisis was first established in Vienna and then admitted into the materia medica of the Edinburgh Pharmacopœia. London, however, did not much credit its virtues as a medicine. 1½ ounces of the lichen were boiled in a quart of milk not longer than a quarter of an hour over a slow fire. A teacupful was directed to be drunk frequently in the course of the day.

A German description runs as follows:—

> After the bitter taste, which is found in the outer layer of the thallus, is got rid of by means of washing in weak potash solution, the result is the sweet Iceland moss (*Lichen islandicus ab amaritia liberatus*).

In Germany it is plentiful in the Fichtelgebirge, a mountain system of north-east Bavaria and in the Harz mountains and Tyrol. The composition is described as Flechtenstärke (Lichenin) and Flechtenbitter (Cetrarin).

LETTERS FOR THE LONDON POSTAL AREA: NEW METHOD OF ADDRESS.

THE Postmaster-General has issued an appeal to the public in London and to their correspondents in the provinces to "adopt a simple system which will improve the postal service at the cost of very little trouble to themselves," thereby helping to save labour and money, which the country requires for war services. Under the system referred to the 112 separate delivery offices in London are each assigned a number to be added to the particular district in which they are situated. This, it is claimed, will materially assist the present staff of inexperienced Post Office sorters to relegate correspondence to its proper destination. The public are invited to observe the following method of addressing letters, parcels, and other postal packets for any house in the London postal area: 1. Name of addressee. 2. Number (or, if there is no number, the name) of the house. If there is a number as well as a name, the number should always be used. 3. Name of street or road in which the house is situated. 4. Initials of the postal district, followed by the number of the office of delivery. 5. The word "London" if the place of posting is outside the London area. It will be immaterial, the Postmaster-General says, whether the name of the sub-district—e.g., Hampstead, Blackheath, Kensington—is inserted, omitted, or wrongly stated, as these will be ignored. We suggest that *any* omission to the fullest possible address may lead to confusion, how widespread we do not pretend to know. In the "Official List of Principal Streets," which can be obtained gratis at any post office, we find Queen-street, Mayfair, and Queen-street, Edgware-road, are both in the same delivery office, W. 1; and Prince's-road, South Wimbledon, and Prince's-road, Wimbledon Park, are both in delivery office S.W. 19. Under the new arrangement the address of THE LANCET Office is 423, Strand, W.C. 2, with the addition of the word "London" for correspondence from the provinces.

BOVRIL PICTURES: "THE DUEL."

IN connexion with their "Picture Scheme" Messrs. Bovril, Limited, of Old-street, London, have sent us a handsome framed engraving, size 40 × 30 in., after a picture by Mr. Cadogan Cowper, A.R.A., and signed by the artist. The picture, which has been excellently reproduced on India paper by Messrs. C. W. Faulkner and Co., represents a pair of duellists engaged in a resolute bout, apparently for the favour of a lady who stands in the foreground with a look of dismay depicted on her countenance. The subject of the picture is the outcome of the dream of a well-known Member of Parliament, when sleeping in the room in which, it was afterwards discovered, such an encounter as is depicted actually took place. This is the expected sequence of events when one dreams in panelled chambers, and Mr. Cowper has rendered the carved oak panelling over the old-fashioned fireplace with great dexterity as a background to his vigorous fighters. Altogether the engraving is well up to the standard of its predecessors in this series, and that standard is a high one.

PREMIUMS OF OLD-TIME MEDICAL APPRENTICES.

APPRENTICESHIP in the medical profession is a thing of the past. There are no indentures now, though some medical men are still alive who were once apprentices serving under a master after indentures had been signed. At the Royal College of Surgeons of England there are three apprenticeship books kept, one recording the payment of the orphan's tax of half-a-crown and the other two (1745–1846) containing lists of apprentices and masters. The last entry in these books is dated April 24th, 1846, and records the fact that George Tertius Talbot had paid Mr. Joseph Henry Green, of Lincoln's Inn-fields, the sum of £315 as an apprentice who was "not to board." Joseph Henry Green was President of the Royal College of Surgeons of England in 1849 and 1858, and a very important person in the medical world, so that he could demand a stiff fee for indentures, but some of the premiums paid previously to that date were very high. The record was reached in January, 1826, when the sum of £1050 was paid to Frederick Tyrrell on behalf of or by William Tice Jones. Again, in 1830 £1050 was paid by or for James Dixon to the same eminent surgeon. On Dec. 2nd, 1825, John Alexander Harper's premium to Aston Key is £1000. £800 was paid for Thomas Egerton to William Money, and for William Pennington to Edward Stanley, of Lincoln's Inn-fields, £700, both in 1822. The last is a frequently occurring sum, as is also £600. But the regulation fee paid to a great surgeon on the staff of a hospital by a student anxious for a corner of his mantle, or something more than crumbs from his table, appears to have been 500 guineas. Such a sum we find repeatedly paid to Green, Abernethy, Earle, Stanley, and other College Presidents. A frequent sum, where lesser men are the masters, was £199 10s., but the sums ranged very widely. As a rule, sons were indentured to their fathers for the nominal sum of 5s., or no fee was paid. A certain James Saner, of Finsbury-square, several times received 5s. Others—famous surgeons—took varying premiums. Thus Bransby Blake Cooper took John Henry Roberts for 5s. in 1829, the year after the famous case of Cooper *versus* Wakley, when Cooper's reputation as a surgeon may have been damaged. Immediately afterwards, however, Cooper's fee rose to £500 received from one John Clement, and continued high as far as the record runs. Samuel Solly was taken by Benjamin Travers for 500 guineas, but Solly himself in 1834 charged £630 to an apprentice.

In the eighteenth century fees were smaller. They did not rise above £400, till in 1770 (May 3rd) £725 was paid by Charles Griffith to William Sharp. Henry Cline and William Blizard were paid premiums of £300 in 1783, but Blizard, who was President of the College in 1822, charged £500 in 1787. James Earle charged £315 in 1784, and the pupil "finds board, &c." On Nov. 4th, 1784, £500 was paid for Astley Cooper to William Cooper, but Sir Astley Cooper took no premium from Edward Cock in 1822, nor from Bransby Blake Cooper just 100 years ago. These were members of his family, and the famous Sir Astley Cooper was attacked

in an early issue of THE LANCET for nepotism. His conduct was defended by Sir James Scarlett in the case of Bransby Cooper *v.* Wakley on the obvious ground that a man was more likely to trust members of his own family than outsiders.

THE PRICE OF FISH.

AN article which appeared recently in the *Daily Mail* advocated as a form of National Service the institution of volunteers for fishing. The suggestion is interesting. The numbers of boats and men available now for the "harvest of the sea" are doubtless known to those most concerned, and a proposal of this kind would naturally be dependent upon factors familiar to the authorities. That there was a harvest may be seen by recalling that at the end of the season 12 years ago the catch of herrings officially stated at Yarmouth alone amounted to 535,378,800 herrings, 700 boats being engaged, and after curing them in the Scotch method, Yarmouth sent to Germany and Russia 239,496 barrels; and Lowestoft, a few miles away, sent to the same places 102,460 barrels, a grand total of 341,956 barrels. On this occasion the "Scotch lassies" came down from the North to pack them.

Much information that is of highly practical importance to-day will be found in a book published in 1908 on "The Romance of the World's Fisheries," by Sidney Wright (Seeley and Co., Ltd., London). With reference to mussels, the author says:—

> But why "go after" mussels when so many millions of them are to be picked from rocks, breakwaters, and mud or shingle-banks? The question is reasonable enough, though it would never be asked by anyone who had the least idea as to the number of mussels that are used in the United Kingdom alone every year. Hundreds of thousands, not of mussels, but of *tons* of mussels, are gathered annually and sold; and, absurd as it may sound, there is little difference between the profits made on them and those derived from the oyster fishery. To France alone the Belgians export over twelve million francs' (half a million pounds') worth every year. Then who are the consumers? The ground, in the first place; all the small mussels, and those which may have been tainted with sewage or poisoned by the copper bottoms of ships, are sent away by the barge-load for manure, or for lightening heavy clay soil. Secondly, the poor. Apart from those mussels that are eaten from choice, or those which the fisher-people out of work are sometimes glad to make a dinner of, many tons of them are eaten by the London poor alone every winter; buying them at a penny a quart, a family can have a meal for twopence. Even then we have not accounted for a third of the numbers given above. The prime mussels are required as bait for line-fishing, and are sold at the rate of rather less than £2 a ton (over 51,000 fish go to the ton). Many fishing boats' crews use over 4 tons per boat in a month in this manner.

Referring to whelks, he states that these fish are a favourite food among the fisher people, and from the fact that a man will often do a hard day's work on nothing else they must needs be nourishing. The proportionate cost and nutriment of these small shell-fish have recently been debated in the press.

VITAL STATISTICS OF BRITISH HONDURAS.

THE Colonial Office has issued a report on the Blue-book of British Honduras for the year 1915. It gives the estimated mean population for the year as 41,928—21,041 males and 20,887 females. The death-rate was 26·2 per 1000 of population, compared with 28·1 in 1914. As usual, the principal cause of death was malarial fever. The birth-rate was 40·092 per 1000. The number of illegitimate births was 695 out of a total of 1681, or 41·35 per cent. The daily average number of patients under treatment and care in Belize Hospital was 40·73, in Corozal Hospital 4·96, in Orange Walk Hospital 4·85, in Stann Creek Hospital 8·2, in Punta Gorda Hospital 9·10, in Belize Lunatic Asylum 70·31, and in the poorhouse 35·82. The average rainfall for the ten years 1906-1915 in Belize was 85·16 inches, the maximum (130·93 inches) being in 1911 and the minimum (63·76 inches) in 1910. The average number of days on which rain fell during the ten years was 127.

P. N.—The term "Bipp" was given by Professor Rutherford Morison to Bismuth subnitrate, Iodoform, and Paraffin Paste, the use of which in the treatment of wounds was described in THE LANCET of August 12th, 1916, p. 268. A paper by Dr. Louisa Garrett Anderson and Dr. Helen Chambers was published in THE LANCET of March 3rd, 1917, giving an account of this treatment at the Military Hospital, Endell-street, W.C., with a note on the bacteriological and chemical qualities of the paste by Dr. Chambers and Mr. J. N. Goldsmith.

Dr. M. L. (Paris).—An article on the subject appeared in THE LANCET of May 7th, 1910, entitled "The Use of Solid Carbon Dioxide," by Edward Reginald Morton, M.D., F.R.C.S. A book on the subject was reviewed in THE LANCET of Feb. 14th, 1914, entitled "Carbon Dioxide Snow," by J. Hall-Edwards, L.R.C.P. Edin., F.R.S. Edin. (London: Simpkin, Marshall, Hamilton, Kent, and Co. Pp. 78. Price 3*s.* 6*d.*). Aerators, Limited, Upper Edmonton, London N., some years ago issued an illustrated explanatory pamphlet entitled "'Prana' Carbon Dioxide Snow Apparatus."

Medical Diary for the ensuing Week.

SOCIETIES.

ROYAL SOCIETY, Burlington House, London, W.
THURSDAY.—Paper:—Dr. J. C. Mottram and Dr. S. Russ: Observations and Experiments on the Susceptibility and Immunity of Rats towards Jensen's Rat Sarcoma (communicated by Prof. H. G. Plimmer).

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

Tuesday, March 20th.

GENERAL MEETING OF FELLOWS, at 5 P.M.
Ballot for Election to the Fellowship.

MEETINGS OF SECTIONS.

Thursday, March 22nd.

NEUROLOGY (Hon. Secretaries—H. Campbell Thomson, C. M. Hinds Howell): at 8 P.M.
A CLINICAL MEETING will be held at the National Hospital, Queen-square, Bloomsbury.

Friday, March 23rd.

STUDY OF DISEASE IN CHILDREN (Hon. Secretaries—A. S. Blundell Bankart, E. A. Cockayne, C. P. Lapage): at 4.30 P.M.
Cases:
Dr. H. C. Cameron: Amyotonia Congenita.
Dr. E. Cautley: Splenic Enlargement.
Papers:
Dr. H. C. Cameron: Status Lymphaticus from the Clinical Standpoint.
Major Hunter, C.A.M.S.: A Remarkable Condition of Development occurring in Two Brothers.

MEDICAL SOCIETY OF LONDON, 11, Chandos-st., Cavendish-sq., W.
MONDAY, THURSDAY AND FRIDAY.—8.30 P.M., Lettsomian Lectures:—Col. C. Wallace, A.M.S., C.B.: War Surgery of the Abdomen.

LONDON DERMATOLOGICAL SOCIETY, St. John's Hospital, 49, Leicester-square, W.C.
TUESDAY.—5 P.M., Paper:—Capt. A. Innes, R.A.M.C. (T.): Pemphigus Acutus in the Anglo-Egyptian Sudan.

ROYAL STATISTICAL SOCIETY, Rooms of the Royal Society of Arts, John-street, Adelphi, W.C.
TUESDAY.—5.15 P.M., Paper:—The Right Hon. the Earl of Dunraven, K.P., C.M.G.: How to Improve our Fishing Industries.

ROYAL MICROSCOPICAL SOCIETY, 20, Hanover-square, W.
WEDNESDAY.—8 P.M., Mr. K. Goadby: Bacteriology of War Wounds.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East.
TUESDAY.—5 P.M., Lumleian Lectures:—Dr. G. A. Sutherland: Modern Aspects of Heart Disease. (Lecture III.)
THURSDAY.—5 P.M., Goulstonian Lectures:—Dr. C. H. Miller: Paratyphoid Infections. (Lecture I.)

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.
MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.
TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.
THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.
FRIDAY.—10 A.M., Dr. Simson: Gynæcological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

ROYAL INSTITUTE OF PUBLIC HEALTH, Lecture Hall of the Institute, 37, Russell-square, W.C.
Course of Lectures and Discussions on Public Health Problems under War and After-war Conditions:—
WEDNESDAY.—4 P.M., Lecture X.:—Prof. Sir Thomas Oliver; The Hygiene of Occupation in War Time. Mrs. E. S. Chesser, M.B., Miss R. E. Squire, Miss A. M. Anderson, and Mr. G. H. Roberts have promised to take part in the discussion.

EDITORIAL NOTICES.

IT is most important that communications relating to the Editorial business of THE LANCET should be addressed *exclusively* "TO THE EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, *and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.*

We cannot undertake to return MSS. not used.

Offices: 423, STRAND, LONDON, W.C. 2.

MANAGER'S NOTICES.

ALTERATION IN THE PRICE OF "THE LANCET."

INCREASED war expenses and cost of production necessitate an increase of the price of THE LANCET. Commencing with the new year, the price was raised to 8d. The rates of subscription remain as revised in October.

TO SUBSCRIBERS.

WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C. 2, are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and *not* to THE LANCET Offices.

Subscribers abroad are particularly requested to note the rates of subscriptions given on page 4.

METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, March 14th, 1917.

Date.	Rain-fall.	Solar Radio in Vacuo.	Maximum Temp. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Remarks.
Mar. 8	...	63	35	25	Fzn.	28	Fine
,, 9	...	62	39	28	32	31	Overcast
,, 10	0·03	56	47	31	37	37	Overcast
,, 11	0·06	56	51	37	46	47	Overcast
,, 12	0·42	49	44	43	43	43	Raining
,, 13	0·03	64	48	35	37	37	Overcast
,, 14	0·14	76	47	37	43	44	Raining

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

The following journals, magazines, &c. have been received:—Quarterly Journal of Microscopical Science, Malattie del Cuore, Nordiskt Medicinskt Arkiv, Midland Medical Journal, Medical Review, American Journal of Public Health, Therapeutic Gazette, Revue de Chirurgie, Journal of Nervous and Mental Disease, Archives of Internal Medicine, &c.

Communications, Letters, &c., have been received from—

A.—Messrs. Adlard and Son, and West and Newman, Lond.; Messrs. Allen and Hanburys, Lond.; Messrs. Armour and Co., Lond.; Capt. J. E. Adams, R.A.M.C.(T.); Dr. Marion B. Andrews, Belfast; Messrs. Arnold and Sons, Lond.; Association of Science, Lond., Sec. of; Arnhemsche Import Co., Arnhem.

B.—Mr. W. Bryce, Edinburgh; British Organotherapy Co., Lond.; Mr. A. G. Berry, Lond.; Messrs. W. H. Bailey and Son, Lond.; Bolton Guardians, Clerk to the; Mr. J. F. Briscoe, Southampton; Messrs. Burroughs Wellcome and Co., Lond.; Bury and District Joint Hospital Board, Clerk to the; Surg. S. L. Baker, R.N.; British Berna Motor Lorries, Lond., General Manager of; Birkenhead Guardians, Clerk to the; Mr. P. J. Byrne, Clonmel; Mr. J. L. Boone, Nashville, Tennessee; Mr. J. A. Byrne, Woodford; Dr. W. Langdon Brown, Lond.; British and Foreign Sailors' Society, Lond.; Mr. G. W. Baker, Leicester; Surg.-Gen. Sir David Bruce, A.M.S., C.B.

C.—Dr. E. M. Clarke, Truro; Mr. H. A. Collins, Croydon; Dr. A. K. Chalmers, Glasgow; Mr. C. H. Cummins, Lond.; Dr. W. H. L. Copeland, Lond.; Dr. J. W. Cropper, Lond.; Mr. J. F. Colyer, Lond.

D.—Dr. J. Donnelly, Gambaga; *Drapers' Record*, Lond.; Dr. F. V. Davison, Minas de Corrales; David Lewis Northern Hospital, Liverpool, Sec.-Supt. of; Denver Chemical Manufacturing Co., Lond; Miss J. E. Dewar, Lond.; Dr. V. Dickinson, Lond.; Lieut.-Col. L. S. Dudgeon, R.A.M.C.; Messrs. Duncan, Flockhart, and Co., Edinburgh.

E.—East Suffolk and Ipswich Hospital, Ipswich, Sec. of; Lieut.-Col. T. R. Elliott, R.A.M.C.; Dr. J. Eyre, Lond.

F.—Capt. S. Fenwick, R.A.M.C.; Dr. W. M. Fletcher, Lond.; Factories, Chief Inspector of, Lond.; Finnish Booksellers, Ltd., Helsingfors; Dr. F. Fox, Lond.;

G.—Dr. C. D. Green, Romford; Capt. A. R. Green, R.A.M.C.; Mr. A. Garrow, Elgin; Grimsby County Borough, Town Clerk of; Mr. H. Grattan, Lond.; Capt. R. L. Gamlen, I.M.S. (retd.); Mr. E. W. H. Groves, Clifton; Mr. H. J. Gauvain, Alton;

H.—Dr. T. E. Harwood, Lond.; Capt. W. O. Halpin, R.A.M.C.; Major R. J. D. Hall, R.A.M.C.; Mr. F. W. Holland, Lond.; Dr. F. Hernaman-Johnson, Lond.; Holborn Surgical Instrument Co., Lond.; Dr. C. W. Hutt, Brighton; Messrs. W. and R. Holmes, Glasgow; Dr. N. B. Harman, Lond.; Messrs. A. Heywood and Son, Manchester; Dr. R. C. Holt, Manchester; Prof. M. Hartog, Cork; Mr. A. F. Hills, Penshurst.

I.—Messrs. Isaacs and Co., Lond.

J.—Capt. D. Johnston, R.A.M.C.; Capt. W. M. M. Jackson, R.A.M.C.; Dr. A. H. Joseph, Bexhill-on-Sea; *Journal of State Medicine*, Lond., Editor of.

K.—Mr. D. Kennedy, Dublin; Kent Education Committee, Maidstone, Stores Supt. of; Prof. A. Keith, Lond. Kensington and Fulham General Hospital, Sec. of.

L.—Capt. T. Lyon, C.A.M.C.; Mr. C. E. Lisle, Birmingham; Messrs. H. K. Lewis and Co., Lond.; Dr. A. Love, Greenock; Local Government Board, Lond.; Mr. F. W. Lowndes, Liverpool; Dr. S. C. Lawrence, Lond.; London Throat Hospital, Sec. of; London and Provincial Retail Newsagents' Association, Sec. of; London County Council Asylum and Mental Deficiency Committee, Accounting Officer of; Dr. M. Lesieur, Paris; Dr. G. C. Low, Lond.; Mrs. Langmead, Lond.; Messrs. Leslie, Lond.

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N.—Mr. P. Newell, Margate; Mrs. Gladys Nattrass, Jarrow-on-Tyne; National Council for Combating Venereal Diseases, Lond.; Mr. M. Nijhoff, The Hague; Newcastle upon-Tyne Education Committee, Director of; National Anti-Vaccination League, Lond., Sec. of; Newspaper Society, Lond., Sec. of; Newsvendors' Benevolent and Provident Institution, Lond., Sec. of.

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P.—Mr. H. O. Pilkington, Preston; Lieut. D. S. Pracy, R.A.M.C.; Messrs. F. J. Parsons, Hastings; Dr. A. G. Phear, Lond.; Dr. P. Pope, Lond.

Q.—Queen Charlotte's Lying in Hospital, Lond., Sec. of.

R.—Royal Academy of Medicine in Ireland, Dublin; Royal Institute of Painters in Water Colours, Dr. R. R. Rentoul, Liverpool; Royal Faculty of Physicians and Surgeons, Glasgow; Messrs. Vincent Roberts and Co., Leeds; Royal Sanitary Institute, Lond.; Royal Society of Arts, Lond.; Royal Hampshire County Hospital, Winchester, Sec. of; Royal Waterloo Hospital for Children and Women, Hon. Treas. of; Miss Reading, Grantham; Royal Cornwall Infirmary, Truro, Sec. of; Royal Albert Hospital, Devonport, House Steward of; Royal Statistical Society, Lond.; Royal Institute of Public Health, Lond.; Royal Society, Lond.; Royal Society of Medicine, Section of Obstetrics and Gynæcology, Lond.; Mr. T. Roony, Nairn; Royal Society of Medicine, Editor of the Proceedings of.

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T.—Dr. D. D. Tindal, Lond.; Capt. F. J. Tees, C.A.M.C.; Dr. L. M. G. de la Torre, Lima; Taunton and Somerset Hospital, Taunton, Sec. of.

U.—Under-Secretary of State, Home Office, Lond.

V.—Verkehrsverein Davos, Davos Platz; Mr. Voncken.

W.—Dr. N. Walker, Edinburgh; Dr. E. W. A. Walker, Oxford; Wiltshire County Council, Trowbridge, County School Medical Officer of; Messrs. A. J. Wright, Lond.; Messrs. Willows, Francis, Butler, and Thompson; Messrs. W. Wood and Co., New York; Wolverhampton and Staffordshire General Hospital, Wolverhampton, House Governor of; Walsall and District Hospital, Sec. of; Messrs. Willing and Co., Lond.; Mr. C. L. H. Wallace, Lond.; Mr. J. W. T. Walker, Lond.; W. H. H.; Major G. W. Watson, R.A.M.C.(T.); Dr. H. Woods, Lond.; Dr. F. J. Wethered, Lond.

Letters, each with enclosure, are also acknowledged from—

A.—A. Y. G.; A. G. E.; A. G.; A. M.; Anglo-French Drug Co., Lond.;

B.—Mr. E. G. F. Barnes, Dublin; Surg. H. C. Broadhurst, R.N.; Dr. J. Biernacki, Lond.; Messrs. Butterworth and Co., Lond.; Mr. C. Boulangé, Paris; Brentford Guardians, Clerk to the; Lieut. N. Bradly, R.A.M.C.; Mr. P. L. Booth, Walney Island; Birmingham Education Committee, Treas. to the; Bradford Childrens' Hospital, Sec. of; Messrs. Bailey and Son, Lond.

C.—Surg. H. Carlill, R.N.; Capt. M. M. Cruickshank, R.A.M.C.; Carlow District Lunatic Asylum, Medical Supt. of; Clandon Park Hospital, Guildford, Sec. of.

D.—Devonshire Hospital, Buxton, Sec. of; Doctor, Southsea; Lieut.-Col. A. M. Davies, R.A.M.C.; Mr. W. Dowse, Birmingham; Capt. J. D. Dyson, R.A.M.C.; David Lewis Colony, Manchester, Sec. of; Dorset County Council, Dorchester, Clerk to the; D. A. H.

E.—Dr. V. J. Elwell, Waterloo; Messrs. Elders and Fyffes, Lond.; Messrs. E. Evans and Sons, Shanghai.

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O.—Dr. S. J. Ormerod Leatherhead.

P.—Mrs. Paterson, Jersey; Mr. C. J. Palmer, Mansfield Woodhouse; Mr. J. Pardoe, Lond.

R.—Dr. J. K. Reid, Morvern; Reuter's Telegrams Co., Lond.; Messrs. Richardson and Co., Lond.; Dr. M. J. Ryan, Crumlin.

S.—Mr. W. P. Sharples, Wye; Lieut.-Col. T. H. Scott, R.A.M.C.; South African Institute for Medical Research, Johannesburg, Sec. of; Dr. A. Stewart, Bury; Messrs. W. H. Smith and Son, Stafford; Mrs. Stannell, Lond.; Sheffield Guardians, Clerk to the; Mr. C. H. Stansfield, Reading; Messrs. Sutton and Phillips, Lond.; Mr. S. Slade, Nayland; Dr. A. Shillitoe, Lond.

T.—Mr. C. Turner, Lond.; Troon Town Council, Clerk to the.

V.—Victoria Hospital for Sick Children, Hull, Sec. of.

W.—Capt. A. White, R.A.M.C.; Capt. J. M. Whyte, R.A.M.C.; Dr. W. J. Wilson, Belfast.; Dr. E. Wilks, Lond.